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ANNUAL REPORT OF THE

SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES

FOR THE FISCAL YEAR

1913

WASHINGTON
GOVERNMENT PRINTING OFFICE
1914

Treasury Department,
Document No. 2700.
Public Health Service.

LETTER OF TRANSMITTAL.

Treasury Department,
Office of the Secretary,
Washington, December 5, 1913.

Sir: In accordance with section 9 of the act of Congress approved July 1, 1902, "An act to increase the efficiency and change the name of the Marine-Hospital Service," I have the honor to transmit herewith the report of the Surgeon General of the Public Health Service for the fiscal year 1913.

Respectfully,

W. G. McAdoo,
Secretary.

The Speaker of the House of Representatives.

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OPERATIONS OF THE UNITED STATES PUBLIC HEALTH SERVICE

1913

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE.

Treasury Department,
Bureau of the Public Health Service,
Washington, D. C., November 1, 1913.

Sir: In accordance with the act of July 1, 1902, I have the honor to submit for transmission to Congress the following report of the operations of the Public Health Service for the fiscal year ending June 30, 1913. This is the forty-second annual report of the service in the one hundred and fifteen years of its existence.

The administrative supervision of the work of the service is conducted through the seven divisions of the bureau as follows:

(1) Scientific research and sanitation.
(2) Foreign and insular quarantine and immigration.
(3) Domestic (interstate) quarantine.
(4) Sanitary reports and statistics.
(5) Marine hospitals and relief.
(6) Personnel and accounts.
(7) Miscellaneous.

Each division is in charge of a medical officer of the service, and has distinct jurisdiction over certain operations of the service, including supervision of officers and employees. By means of special bureau regulations their functions are coordinated. and their operations brought under the direct personal supervision of the Surgeon General.

Amendments to Interstate Quarantine Regulations.

Under the quarantine act of February 15, 1893, important amendments to the Interstate Quarantine Regulations have been promulgated by the department relating to the purity of water and ice supplied to passengers in interstate traffic, and prohibiting the use of insanitary towels and drinking cups on interstate carriers. The full text of these regulations will be found in that portion of this report devoted to operations of the service under the supervision of the Division of Domestic Quarantine. The enforcement of the regulations has greatly increased the work of this division of the bureau.

SCIENTIFIC RESEARCH.

The scientific investigations authorized by law have been carried on during the year as facilities would permit. Important laboratory studies have been made in the several laboratories maintained by the service, and the field investigations have been extended as in previous years. While adequate authority for these latter studies is contained in the act approved August 14, 1912, some delay was experienced in their development on account of the veto, on March 4, 1913, of the sundry civil act, which was to provide necessary funds, and which did not become a law until June 23, 1913.

Plans had been devised, however, for the further development of research work, and with the passage of the act referred to on the date mentioned, arrangements were immediately begun to utilize the funds provided therein for the extension of field investigations.

These studies are being advanced as rapidly as possible and deal with the subjects of pellagra, trachoma, malaria, Rocky Mountain spotted fever, typhoid fever, tuberculosis, parasitic diseases, pollution of navigable waters, sanitary administration, school sanitation, and the hygiene of occupations.

Administrative supervision of the work has been maintained through the bureau Division of Scientific Research. The duties devolving on this division have greatly increased. In consequence, an additional clerk has been provided, but on account of the further increase of work that will follow and the larger funds that will require to be handled, two additional assistants will be necessary.

Not only are additional assistants needed in the administrative work, but the staff of scientific workers in the laboratories and in the field should be increased. This relates especially to the Hygienic Laboratory. The number of scientific workers and attendants in this institution has not been increased in proportion to its growth and the amount of work to be performed there.

There is urgent need also of additional space at the Hygienic Laboratory to prevent overcrowding and to provide for the increased amount of research work being done. In the annual estimates of appropriations for the fiscal years 1911 and 1912 there was included in each an item of $175,000 for the construction of an additional fireproof building. The last addition to the building was completed and occupied in the spring of 1909. Since then the work of the laboratory has increased to such an extent as to cause overcrowding, which is dangerous, in view of the character of the work carried on.

Among the more important subjects that have been investigated during the past year in the several laboratories and in the field are the following: Typhoid fever, cholera, plague, smallpox, typhus fever, tuberculosis, trachoma, pellagra, poliomyelitis, malaria, dengue, hookworm disease, water pollution, and milk hygiene. Scientific studies have also been made in connection with the supervision of viruses, serums, and toxins, the preparation and distribution of antirabic virus, the enforcement of the white phosphorous match law, and other subjects, and aid has been rendered to other branches of the Government. The above matters and the work conducted in the several laboratories will be referred to under appropriate headings.

Investigations of typhoid fever, which have been a prominent part of the research work of the service since 1906, have been continued. As a result of these studies and the facts developed by other workers, there is sufficient knowledge, if utilized, to prevent this disease. Notwithstanding, typhoid fever continues to prevail in practically every section of the country. Future studies of typhoid fever should therefore be directed to devising plans and stimulating interest in their execution generally, and in the investigation of local outbreaks as they occur.

During the past year a number of such studies were made, one of these having an important bearing on the control of the disease in interstate traffic.

GASTROENTERITIS AND TYPHOID FEVER AMONG EXCURSIONISTS ON MISSISSIPPI RIVER STEAMER.

In accordance with a request of the health officer of Clinton, Iowa, approved by the Iowa State board of health, Surg. L. L. Lumsden was detailed to make an investigation of an outbreak of gastrointestinal disturbances and typhoid fever, which occurred in July and August, 1912, in Clinton, Iowa, and other towns along the Mississippi River.

The health officer of Clinton, Dr. H. R. Sugg, had collected before Dr. Lumsden's arrival considerable data about the Clinton outbreak, which he placed at Dr. Lumsden's disposal, in addition to assisting in the collection of further data. These findings furnished strong evidence that the infection responsible for the outbreak had been contracted in the course of an excursion trip made on the steamer *G. W. Hill*, on July 29, to Davenport, Iowa, and back.

Out of about 1,200 persons who went from Clinton on the excursion it was estimated that at least 600, or 50 per cent, became ill between 12 and 72 hours after the return from the trip, the symptoms described being similar to those which have appeared in outbreaks of diarrhea, resulting from the use of water polluted with sewage. Among other residents of Clinton who did not go on that trip there was during the summer of 1912 no unusual occurrence of diarrheal disease.

Dr. Lumsden found that the excursionists from Comanche, Iowa, and Albany, Ill., the other two places where the steamer took passengers on that trip, had suffered in the same way and in about the same proportion as those from Clinton. Thus it was found that 8 cases of typhoid had developed among the excursionists from Clinton, 2 among those from Comanche, and 1 among those from Albany, forming a total of at least 11 cases of typhoid fever and about 800 cases of severe diarrhea among the 1,550 excursionists, while some 29,000 persons living in the same towns and exposed to the same general conditions while at home had not been affected.

An investigation was then made of the results of the trip on the same steamer the following day, July 30, among passengers from Sabula, Iowa, via Savanna, Ill., Bellevue, Iowa, and Sand Prairie, Ill., to Dubuque, Iowa, and return. It was found that among the 63 passengers from Sabula, 15 had developed diarrhea and 2 typhoid fever, while among residents who did not go on the excursion there had not been during the summer any outbreak of intestinal disease. In the other river ports it was ascertained that no disease had developed among the other 400 passengers who had gone on the excursion from Savanna, Bellevue, and Sand Prairie. It thus appeared that in the steamer's trip between Sabula and Savanna something had occurred which prevented the persons who embarked at Savanna and subsequent ports from exposure to the same infection to which previously embarked passengers on that and the preceding day had been subjected.

Among the possible causes of infection on board the steamer were the following:

(1) The foods and beverages taken aboard the steamer by the excursionists.

(2) The foods and beverages—sandwiches, ice cream, and soft drinks—sold to the excursionists on the steamer.

(3) The drinking-water supply (including the ice used in the tanks) furnished the excursionists while they were on the steamer.

The first cause was easily eliminated in view of the fact that such foods and beverages had come from many different homes, with hardly any relation as to possible infection among them. In regard to the second cause, while it is possible that the ice, ice cream, and other foods served on the steamer might have contributed to the dissemination of the infection, various facts, as for instance the absence of disease among excursionists who consumed food from the same source, showed that this had not been the sole or the chief source of infection.

On the other hand, the evidence collected pointed to the drinking water furnished from the tank on the upper deck of the steamer as the principal or only immediate cause of infection. A number of persons who went on the excursion but did not drink of this water did not get sick, while all the sufferers who were interviewed gave a history of having used that water. A number of the excursionists stated that the water from this particular tank had been much more turbid just as the steamer left Davenport than it was on the trip down, while some of them testified to their noticing the filling of the tank with river water, when the intake must have been in the immediate neighborhood of the Davenport sewer outlets.

The following conclusions were reached by Dr. Lumsden:

1. The outbreaks of diarrhea and typhoid fever which occurred among the persons who went on one of the excursion trips made by the steamer *G. W. Hill* on July 29 and July 30, 1912, were caused, beyond reasonable doubt, by infection in the drinking water supplied aboard the steamer.

2. The infected water was pumped into the tank on July 29 while the vessel was either at the landing at Davenport or at some point in the river between Davenport, Iowa, and Albany, Ill.

3. The bulk of the evidence strongly suggests that the infected water was pumped into the drinking-water tank while the steamer was at the landing and a short while before leaving Davenport on July 29.

4. The water supplies used generally on the steamers plying on the Mississippi River along its course between St. Louis and St. Paul are potentially dangerous, and the methods of obtaining such water supplies should be corrected and conducted under official supervision.

While at St. Louis on October 10, Surg. Lumsden looked into the matter of water supplies used on steamers generally—both excursion steamers and packets—plying between St. Louis and St. Paul and between intermediate points along the river. He found that the general custom for these steamers is to take water for drinking purposes from the Mississippi River. On most of the vessels the water is run through some device on board designated as a filter. Such filters, as they are, and operated, as they usually must be, are necessarily of low efficiency. A demonstration was given of the fitration of the water supply for one passenger vessel at a wharf in St. Louis in the immediate neighborhood of sewer outlets. Especial pains apparently were taken in making the demonstration, but in spite of the pains the water persisted in being muddier after it had been passed through the filter than it was before. Evidently the mud collected in the filter was being washed through.

In view of the conditions associated with the water supplies furnished on steamers plying on the upper Mississippi River it is not surprising that an extensive outbreak of sickness caused by water-borne infection did develop among the passengers on one of these vessels, viz, the steamer *G. W. Hill*, but it is surprising that such outbreaks have not occurred on numerous occasions.

In order to prevent the obvious dangers from the occurrence of such conditions, the following recommendations were made by Dr. Lumsden:

1. That water supplies used on river steamers and sanitary conditions generally pertaining to such steamers be made subject to adequate official inspection, the vessels plying between ports in different States to be inspected from time to time by officers of the United States Public Health Service and those plying between ports in the same State to be inspected from time to time by State or municipal health officers.
2. That all steamers plying on the Mississippi River be required to furnish water for drinking purposes for persons on board which will be demonstrably free from potential danger.
3. That steamers take their water supplies from sources—such as city or town water supplies along the river—certified as being safe by National or State health officials.

A complete report of these investigations was published in the Public Health Reports of November 29, 1912.

INVESTIGATION OF TYPHOID FEVER AT FORT DODGE, IOWA.

At the request of the State Board of Health of Iowa, Surg. P. M. Carrington was detailed at Fort Dodge, Iowa, from October 28 1912, to November 8, 1912, for the purpose of investigating an outbreak of typhoid fever. It was found that 101 cases had occurred from January 1 to October 31, this in a population of 15,000 being equivalent to a case rate of 800 per 100,000 during the year. The case fatality was low—about 4 per cent—although several cases went to other localities for treatment, and the outcome was not reported.

An epidemiological study was made, and the public water supply was considered the chief factor in the causation of the outbreak for the following reasons:

(1) Known sewage contamination.

(2) Sixty-nine out of seventy-three cases had obtained their drinking water in whole or in part from the city mains.

(3) There was no other known factor common to a majority of the cases.

(4) Continuation of cases more than two weeks after most of the flies had been killed by cold weather.

(5) The sudden cessation of cases 12 days after the institution of hypochlorite treatment.

Comprehensive recommendations were therefore submitted to the mayor and council for the securing of a supply of pure water, the correction of such insanitary conditions as might favor the spread of typhoid fever, and the establishment of an efficient health department. The complete report rendered by Surg. Carrington was published in the Public Health Reports for February 14, 1913.

Paratyphoid Fever Outbreak in Roanoke, Va.

At the request of the State health commissioner of Virginia, Surg. L. L. Lumsden was detailed on March 22, 1913, to make an investigation of an outbreak of paratyphoid fever at a private hospital at Roanoke, Va. The outbreak presented certain interesting peculiarities, and in investigating it Dr. Lumsden had the cooperation of Drs. A. W. Freeman, assistant State health commissioner of Virginia, and W. B. Foster, health officer of Roanoke.

The institution is a surgical hospital of about 40 beds. The buildings, situated in the residential portion of the city, are modern and well built. They are supplied with water from the city supply and provided with modern sewerage connected with the public system.

The outbreak comprised 16 cases verified bacteriologically, and two other cases, probably paratyphoid, but not verified. At the time of the outbreak the city of Roanoke was practically free from cases of typhoid fever, and no cases of paratyphoid had been reported.

The first probable case was in the person of a colored boy who had been for several days employed as a helper in the hospital kitchen. On January 9 he developed a high fever and was removed to a room outside the hospital. Typhoid was at once suspected, and a blood culture was made. The blood culture proved negative, and the following day the boy left town, returning to his home in the country. According to the best reports available he was sick only two or three days. Ten days later, on January 19, the resident surgeon of the hospital developed a fever, and was confined to bed about seven days. His case was diagnosed as influenza, the fever lasting only one day after the patient took to bed. Blood culture was not made. Widal test was negative to typhoid, but there was suggestive clumping, with *paratyphoid B. bacilli.*

No further cases developed until February 14, at which time the outbreak proper began, comprising 16 cases and lasting until March 26.

With the exception of the two probable cases previously mentioned, all the cases were among patients of the hospital, and none of the staff, nurses, attendants, or help, numbering 35 in all, exhibited any symptoms of the complaint.

Bacteriological studies established beyond reasonable doubt that the outbreak was caused by infection with *Bacillus paratyphosus*, group B, and suggested by the negative findings in the search for carriers (1) that the outbreak was on the wane, and (2) that the infection was confined to the patients, and therefore readily controllable.

POSSIBLE SOURCES OF INFECTION.

A careful study of the evidence collected and summarized above led to the prompt exclusion of certain factors as possible causative agents. The importation of the infection from outside the hospital in water, milk, or other foods could be positively excluded. The disease was too evidently limited to the hospital to allow of any such assumption.

The possibility of a carrier in the general kitchen infecting the food at the time of its preparation was, of course, thoroughly considered. The absence of infection among the house staff and attendants, the fact that a number of cases had had no food from the general kitchen before developing fever, and the peculiar distribution of cases in the hospital strongly negatived this possibility. Infection of food in the diet kitchens was also highly improbable, since there are only two diet kitchens, one for the two wards on each floor, and the distribution of the cases was uniform between the two floors, but over three times greater for the two wards on the south side than for the two wards on the north side of the hospital.

Besides a very few flies and a good many roaches, no insects were found in the hospital. The flies and roaches appeared to be distributed quite uniformly throughout the hospital. Such insects as these would be expected to operate in the spread of paratyphoid infection through the contamination of foods. The distribution of cases, the evidence against the infection having been distributed from the kitchens, and the negative results of the bacteriological examination of several considerable collections of the insects strongly suggested that insects could not have played more than a very small part, if any, in the dissemination of the infection.

The possibility of a human carrier infecting by finger contact the persons affected was thoroughly considered. No one person, except the resident surgeon and the head nurse, had been in contact with all the patients. It was not considered in the least likely that either of these two persons had had any considerable part in the spread of the infection, and furthermore the bacteriological examinations of blood, feces, urine, and nasopharyngeal secretions from the entire staff, nurses, servants, and attendants gave negative results for paratyphoid infection. Thus both the epidemiological evidence and the bacteriological findings were strongly against the possibility of a human carrier among the personnel of the hospital being the source of the infection.

After a reasonably definite exclusion of all the factors usually first to be suspected in institution outbreaks, there remained for consideration personal contact, or conveyance of the infection to the surgical patients by fingers of persons who were attending actual but unrecognized cases of paratyphoid fever. The disease, probably introduced by the colored boy and continued by the house surgeon, existed for several days in the first case to develop in the outbreak proper before the nature of the infection was suspected. It is quite possible that at the time the house surgeon became infected some of the other members of the hospital personnel or some of the surgical patients in the hospital also became infected without subsequently manifesting the disease in a clinically recognizable form. The hospital is a surgical one and its personnel is unaccustomed to treating communicable diseases. The infection, becoming seeded in the wards while the first cases were being regarded as "grippe," may have been transmitted on the fingers of nurses and attendants, through clinical thermometers, drinking glasses, specially prepared diets, etc., from patient to patient. A meddlesome visitor, who visited and attended 10 of the 16 surgical patients who subsequently developed typhoid, may have had a part in the spread of the infection.

REMEDIAL MEASURES.

The measures recommended to control the infection were as follows:

1. Rigid isolation of all the cases.
2. Prompt and thorough disinfection of excreta from all patients in the hospital, with disinfection of bedpans and urinals each time used.
3. Strict medical asepsis on the part of all nurses in going from patient to patient.
4. Sulphur fumigation of pantries and kitchen to destroy water bugs and other insects.
5. Trapping and "swatting" of flies.
6. General and thorough cleaning of the entire hospital.

All of these measures became effective March 26, 1913. Rigid isolation of all suspected cases had been effected for about a week before. The last case in the outbreak developed on March 26. No further cases were reported subsequently.

A complete report on this outbreak was published in the Public Health Reports for May 30, 1913.

Typhoid Fever in Rural Virginia.

In last year's report (p. 18) reference was made to the investigations of typhoid fever in the rural districts of Virginia. These investigations were continued during the summer of 1912 by Surg. L. L. Lumsden in cooperation with Drs. A. W. Freeman, J. A. Waddell, and W. E. Bray, of the Virginia department of health. The epidemiological studies of the previous year had shown the need for accurate laboratory studies, and attention was therefore concentrated on this phase of the problem, the health officer of Roanoke, Va., tendering the use of the city laboratory for this purpose.

The chief problem for solution in 1912 was the distribution of the typhoid bacillus in the infected community. The studies comprised an examination of known cases of the disease, of cases of mild fever suspected to be typhoid, of persons in contact with cases of typhoid fever, and of various environmental influences. The season was, on account of climatic conditions, most unfavorable for studies of this character, but a large amount of material from these sources was examined for the presence of the typhoid bacillus.

In addition to the above, the material submitted by the field inspectors of the Rockefeller Sanitary Commission, coming from the general population irrespective of association with cases of typhoid, was examined.

These investigations were resumed on July 7, 1913. As before, the laboratory studies are being conducted in the Roanoke health department laboratory, and material for examination is being collected from many different rural sections in which typhoid fever is highly prevalent.

The results of the work of 1911, 1912, and 1913 will be incorporated in the final report of the investigators as soon as possible after the completion of the work during the year 1913. This report, representing, as it does, a large amount of work on the causation and spread of rural typhoid fever, should throw additional light on the various problems involved.

Distribution of Antityphoid Vaccine.

While antityphoid vaccine can not be relied upon as a preventive of typhoid fever to the exclusion of essential sanitary measures in a community, its value as a prophylactic has been attested by use among individuals and large bodies of men. In May, 1911, therefore, antityphoid vaccination was made available to the seamen of the merchant marine, the necessary supplies of vaccine being issued from the Hygienic Laboratory.

In the last fiscal year a limited amount of this preparation has been prepared in the laboratory, and its use encouraged also among employees of the Government. Emergencies have arisen also in connection with threatened outbreaks, which made it necessary to distribute antityphoid vaccine in limited amount. Over 3,000 doses were thus supplied to the Kentucky State Board of Health following the floods in the spring of 1913, and a considerable quantity was sent to other State and local health authorities.

At the request of the respective chiefs of bureaus, antityphoid vaccine has been administered at the Hygienic Laboratory to a considerable number of Government employees, this prophylactic being now available to all Government employees who apply for it.

Studies on Cholera.

In the spring of 1910 Surg. Goldberger began, at the Hygienic Laboratory, some work on cholera, which had to be suspended because of the pressure of other work. It was resumed during the spring of 1913, and is still in progress.

Special attention has been given to a study of cholera media, particularly the newer selective media. This work has now progressed sufficiently to permit of the statement that a medium has been devised that is more favorable to the growth of cholera than any heretofore published, and at the same time possesses marked restraint for the other common fecal bacteria. The report of these studies has been prepared for publication as Hygienic Laboratory bulletin No. 91.

Plague Investigations.

The presence of plague in Porto Rico and Cuba, and the fear of its introduction in this country, caused a number of requests to be made by health authorities in various parts of the country for the assistance of officers familiar with the diagnosis of plague.

At the request of the State health officer of Florida, Surg. J. F. Anderson was sent on August 13, 1912, to Key West to determine whether a suspected rat was infected with plague. From laboratory findings, the conclusion was reached by him that the suspected rat had not been infected with the plague bacillus.

At the request of the Sate Board of Health of Louisiana, Surg. E. Francis was detailed to New Orleans on July 26, 1912, to assist in the examination of rodents conducted in that city, and on October 7, 1912, to Providence, R. I., to assist in the diagnosis of a suspected case of plague, the results being negative in both instances.

Finally, Surg. D. H. Currie was ordered to Galveston, Tex., on August 13, 1912, to advise the local authorities in regard to the systematic bacteriological examinations of rodents for the diagnosis of plague.

Investigation of Smallpox in Kentucky.

At the request of the Kentucky State Board of Health, Surg. Taliaferro Clark was ordered to proceed to points on the Green River to investigate an outbreak of smallpox and advise with local health authorities as to the measures necessary for its control. The investigation extended to the counties of Hopkins, McLean, Butler, Ohio, Grayson, Muhlenburg, and Daviess, and lasted from February 3 to 10, 1913.

Sporadic cases of smallpox had been observed at points on the Green River and vicinity since April, 1912. About two years before an outbreak occurred at Millerstown, Grayson County, with the development of 50 cases of smallpox, which was at first mistaken for chickenpox. There is no doubt that smallpox had been prevailing at places near Green River for a year or more, and possibly much longer. Many of these cases were not reported nor properly diagnosed because of the mildness of the attack. Hence no reliable data, on account of lapse of time since the beginning of the outbreak, could be obtained pointing to the original source of infection.

Many patients in Butler County, mostly young laboring men, gave the source of infection as the Illinois Central Railroad. It appears that the Illinois Central Railroad operates a work train hauling crossties from various points in Grayson, Ohio, and other counties within the State. Attached to this train are several boarding cars, in which these men claimed cases of smallpox had developed. As soon as these facts were ascertained, and the train was located, the secretary of the State board of health was communicated with by telephone and the situation explained. This train operates wholly within the State of Kentucky and is not engaged in interstate traffic.

The first cases were claimed to have been imported into Ohio and Grayson Counties from Louisville, Owensboro, and Evansville, but no definite proof of this assertion could be obtained. The only case reported in McLean County was contracted in Daviess County.

The available reports revealed a rather widespread prevalence of smallpox in the northern section of the Green River watershed. The greatest number of cases were reported from Daviess, Ohio, Grayson, and Butler Counties. The vicinity of the junction of these last three counties was the seat of the greatest prevalence of smallpox, and it likewise offers the greatest obstacles to control by reason of the hostile attitude of the resident population to preventive measures.

Among the influences favoring the spread of smallpox in this section may be mentioned the mild type of the disease that made people unafraid of it, and therefore averse to observe the proper precautions to prevent its spread.

Fully 90 per cent of the people in the territory included in this survey were unprotected by recent vaccination. Approximately 75 per cent at least had never been vaccinated.

In rural communities it is a difficult matter to enforce strict quarantine, especially against a disease of which the people are not afraid. Many instances were reported of cases in the eruptive stage breaking quarantine. The indictment of 14 persons for violation of quarantine ordinances by the Butler County grand jury will doubtless put an end to this practice. In spite of the penalty attached for each offense, under the Kentucky statutes, it is believed many cases of smallpox had been concealed from the health authorities.

A complete report of Dr. Clark's investigation was published in the Public Health Reports for February 21, 1913.

Suspected Typhus Fever at Petersburg, Va.

At the request of the State commissioner of health of Virginia, Passed Asst. Surg. J. Goldberger was detailed on July 6, 1912, to Petersburg, Va., in order to examine a suspected case of typhus. While the clinical picture presented by the patient was that of typhus fever and negative Widal and fecal cultures seemed to exclude typhoid fever, yet no final opinion could be formed as to the nature of the disease, as two guinea pigs inoculated with blood from the patient died prematurely. A diagnosis of probable typhus was therefore made, and a course of treatment was outlined on this basis. It was recommended that the patient's hair should be treated with a parasiticide, his clothing boiled, and that in other respects he should be treated as if suffering with typhus.

Laboratory Investigations of Typhus Fever.

The studies of typhus fever referred to on page 23 of the last annual report have been continued in the Hygienic Laboratory, particular attention being paid to the question of natural immunity to the disease. It was found that approximately 20 per cent of monkeys resist the primary injection of virulent material. This immunity of monkeys to the disease has without doubt played an important part in the reports of certain observers as to the filterability of the virus and perhaps also the seat of the virus in the blood.

The typhus-fever virus originally obtained from a case of so-called Brill's disease in Mount Sinai Hospital on September 20, 1911, is still maintained in the laboratory by passage from guinea pig to guinea pig. It has now been almost two years since this was begun. In spite of this long-continued passage from animal to animal there does not seem to have been any change in the virulence of the infection.

Alleged Tuberculosis Cures.

Announcements in the lay press during the year served to attract considerable attention to a number of remedies advocated for the cure of tuberculosis. With a view to safeguarding the interests of the public and securing the enforcement of the law of July 1, 1902, for the control of the sale of biological products in interstate traffic, action was taken by the bureau in several instances.

The Friedmann treatment.—During the latter part of the fiscal year a board of service officers, consisting of Surg. J. F. Anderson and Passed Asst. Surg. Stimson, was instructed to investigate a treatment for tuberculosis prepared and advocated by Dr. Friedrich Franz Friedmann, of Berlin, Germany. These studies have been conducted in part in New York City by the observation in certain hospitals located there of patients treated by Dr. Friedmann and in Washington by laboratory studies of certain materials given the board by Dr. Friedmann for investigation. A preliminary report has been made to the bureau by this board. While the studies of the board have not yet been completed, the preliminary report shows that the extravagant claims made for the treatment by its sponsors have not been confirmed by the board. The observation of patients in the New York hospitals is being continued and the studies of the cultures and pathogenic properties of the organism used in the preparation of the vaccine are now being continued in the Hygienic Laboratory.

The preliminary report referred to was published in the Public Health Reports of May 16, 1913.

The Duket treatment.—In accordance with repeated requests for an investigation of a remedy originated by Dr. Peter P. Duket, of Chicago, Ill., Surg. J. O. Cobb was instructed to make preliminary inquiries in regard to the character of this treatment and the advisability of undertaking the investigation requested. A report was made by him on May 16, advising, for various reasons, against the proposed investigation, and the bureau declined to take any further action in regard to the matter.

The Von Ruck treatment.—In accordance with a resolution of the United States Senate, the laboratory was instructed about the close of the fiscal year to investigate the claims made by Dr. Karl von Ruck and Dr. Sylvio von Ruck for a method of immunization against tuberculosis prepared by these men. Studies of this treatment have not yet been commenced, but it is purposed to begin them at a very early date.

STUDIES ON TUBERCULOSIS.

The universal prevalence of tuberculosis and the numerous claims made for different methods of treatment render necessary systematic studies of the disease in the field and in the laboratories which will throw light on its relation to interstate traffic.

The question of the relationship of the various acid-fast bacteria to the tubercle bacillus is of great importance, especially in view of the fact that some workers have claimed the production of resistance to tuberculosis infection by animals as a result of the treatment with such acid-fast bacteria.

The question of the change of biologic characteristics of the tubercle bacillus by passage through the cold-blooded animal is also one that should receive attention.

INVESTIGATIONS OF CONTAGIOUS AND INFECTIOUS DISEASES AMONG THE INDIANS.

In the act approved August 24, 1912, making appropriations for the current and contingent expenses of the Office of Indian Affairs, for fulfilling treaty stipulations with various Indian tribes, and for other purposes, for the fiscal year ending June 30, 1913, there was included the following provision:

> *Provided:* That the sum of $10,000, or so much thereof as may be necessary, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to enable the Public Health and Marine-Hospital Service to make a thorough examination as to the prevalence of tuberculosis, trachoma, smallpox, and other contagious and infectious diseases among the Indians of the United States, full report to be made to Congress not later than February 1, 1913, with such recommendations as may be deemed advisable.

In accordance with the directions contained in this law steps were taken to make the necessary investigations. They consisted in examinations of available records at Indian agencies and boarding schools as to the past prevalence of contagious and infectious diseases, consideration of available records of State boards of health, examinations of Indians on reservations and in boarding schools, inspection of insanitary conditions having a bearing on the propagation of communicable diseases and house to house inspections upon as many reservations as possible.

The field investigations were begun September 28, 1912, and terminated December 30, 1912, 14 officers being assigned to the work. Reservation and nonreservation boarding schools in 25 States were visited, and a total of 39,231 Indians examined, representing approximately one-eighth of the entire Indian population of the continental United States.

The examinations consisted in complete inspections for the detection of trachoma, supplemented by physical examinations for tuberculosis whenever indicated by the general appearance or the family history. In addition, the tuberculin (Von Pirquet) test was applied to 1,225 Indian children to ascertain the extent of tribal exposure, and a sufficient number of arms were examined to determine the thoroughness with which vaccination had been performed.

Attention was also paid to the sanitary conditions in schools and on reservations, with special relation to housing conditions, food supply, and social and personal habits tending to favor the spread of disease among the Indian population. As a result of the examinations it became evident that trachoma and tuberculosis are veritable scourges of the Indian race.

Trachoma.—Out of 39,231 Indians examined at all the reservations and nonreservation boarding schools visited, 8,940 individuals, or 22.7 per cent of the entire number, were found to have trachoma.

The incidence of trachoma was found to vary greatly in the different sections of the country and even in different parts of the same reservation. The highest percentage of incidence was found in Oklahoma, where 68.6 per cent of those examined were found to be trachomatous. In New York, on the other hand, only 2, or 0.2 per cent, out of 943 Indians had the disease, and these two contracted the infection at a nonreservation boarding school.

Trachoma was found to be generally prevalent in the schools to a greater degree than in the reservations from which the pupils are drawn, and in nonreservation boarding schools it was found that groups of pupils, from areas where trachoma is absent or but slightly prevalent, presented a high percentage of infection. The inference was reasonable that these pupils contracted the disease at such nonreservation boarding schools.

No reliable data could be obtained by which the origin and duration of the disease among the Indians could be determined. On the whole, it appears that trachoma has been prevalent among Indians in widely scattered sections for many years, but the source of the infection among them must, in all probability, remain a mystery.

Tuberculosis.—Although no accurate data could be obtained relative to the length of time tuberculosis has existed among the Indians, it was found that the disease is widespread among them.

Considerable variation was noted in the case incidence of the disease, the percentage of tuberculous Indians varying in the several States and on the different reservations in the same State. The more primitive the Indian, generally speaking, the higher was the percentage of tuberculosis.

On the whole, it may be said that the prevalence of tuberculosis among the Indians is very greatly in excess of that among the white race, depending on locality, and the survey, as conducted, has revealed a situation so serious as to require the prosecution of vigorous measures for its relief.

Smallpox.—Only 6 Indians of the 39,231 inspected were found suffering from smallpox at the time of the examination. Minor outbreaks have been noted from time to time on reservations in various parts of the country, but the prevailing type of this disease has been mild and but few deaths have resulted.

It was estimated that in Arizona at the time of the investigation there were 23,000 Indians who had not been vaccinated. Apart from this large body of unprotected Indians, the rest of the Indian population may be said to be vaccinated with a fair degree of thoroughness.

Typhoid fever and other diseases.—No case of typhoid fever was met with on reservations or in schools among the Indians inspected, and such records as were available at schools and agencies showed the disease to be very uncommon among them.

It may be expected, however, when the Indian is brought into closer contact with white populations that typhoid fever will become increasingly prevalent in the Indian race. There was no evidence that other infectious and contagious diseases are more prevalent among Indians than among the white population.

On the whole, the sanitary conditions on reservations were found unsatisfactory. The primitive Indians themselves were found to be careless and dirty in their personal habits and generally ignorant of the first principles of hygiene. Their personal and social habits favor the spread of disease, as they are careless about spitting and the disposition of human and household waste. Their fondness for visiting, together with dances and social gatherings, which are attended by the sick and the well, afford opportunity to spread any communicable disease which is present.

The high prevalence of trachoma and tuberculosis among the Indians is of importance, not only with respect to the Indian but also to other races. Many counties on Indian reservations are being opened to white settlement, and the Indian is in a gradual process of assimilation with the rest of the population. The future development of transportation also will tend to bring the Indian into closer contact with other inhabitants. The control of communicable diseases among Indians and the prevention of their spread to other races are, therefore, indicated.

On completion of the field investigations, all the data collected by the several officers were collated by the bureau and embodied in a report which was submitted to Congress January 23, 1913. This report was published as Senate Document 1038 (62d Cong., 3d sess.) and contained not only the data mentioned, but recommendations dealing with conditions found, which, in many instances, were a menace to the welfare of the Indian and to the health of the country generally.

INVESTIGATIONS OF TRACHOMA IN MINNESOTA.

In the annual report for 1912, page 24, reference was made to a preliminary survey of conditions in Minnesota to determine the prevalence of trachoma among the Indians on the White Earth and Leech Lake Indian Reservations. As a part of the investigations of contagious and infectious diseases among the Indians in the United States, a second survey was made by Surg. T. Clark in October and November, 1912. The results of these studies were received and embodied in a report, which was sent to Congress and published as Senate Document No. 1038.

The previous surveys having related largely to the Indian population in Minnesota, a third survey was begun by Dr. Clark in accordance with orders of February 19, 1913. This last survey consisted of an examination of school children in public and parochial schools and various places within the State, pupils of the various State normal schools, students of the State agricultural school at Minneapolis, and inmates of the various penal and reformatory institutions and schools for the deaf, blind, and feeble-minded.

The work was carried on in cooperation with the State Board of Health of Minnesota, and as a preliminary measure the secretary of that board addressed letters to the boards of education of the various towns to which visits were to be made. Permission for such examinations was promptly granted, the various boards of education, with one exception, being alive to the desirability and importance of these surveys.

The examinations were confined to no one particular class of the population, but embraced all classes at widely separated points. They consisted of an inspection of the conjunctiva of each individual after everting the eyelids so as to allow of proper scrutiny. In this manner Dr. Clark within the past 12 months examined within the State of Minnesota 52,847 persons of all classes, including Indians, and found 610 cases of active trachoma, i. e., 1.14 per cent of the total number examined. In the white population 77 cases were found among 49,305 people examined, as compared with 533 cases among 3,542 Indians examined. In a report published in the Public Health Reports June 27, 1913, appear the detailed data collected during these studies. The examinations were confined to no one particular part of the cosmopolitan population of the State, but embraced all elements at points widely separated. The results of the surveys are, therefore, representative of the general conditions within the State, and Dr. Clark in his report states conclusions based thereon and submits a number of definite recommendations in respect to the control of trachoma in that State, both among white and Indian populations.

Investigations of Trachoma in California.

In a letter of December 21, 1912, the secretary of the State Board of Health of California requested the detail of an officer of the service to make a study of the prevalence of trachoma among the school children of certain portions of Tulare County contiguous to Porterville, as it was feared that trachoma was becoming established among the school population.

Surg. M. W. Glover was assigned to this duty, and the results of his survey showed that the disease has so far not spread to any extent in the region referred to, as among 1,478 school children examined only 5 positive cases and 1 doubtful case of trachoma were found. It appeared, however, that folliculosis prevailed to a considerable extent, 161 cases being found among these children. Of the 6 cases of trachoma, 2 only were natives of the county, the other 4 being imported cases.

A detailed report of this investigation was published in the Public Health Reports of March 28, 1913.

Investigations of Trachoma in Tennessee.

While engaged in other public health duties in Tennessee, Surg. J. W. Schereschewsky made inspections of three institutions in and around Knoxville to determine the extent of the prevalence of trachoma among their inmates. At the Knox County Poor Farms it was found that 17 out of 60 persons examined were suffering from trachoma. At the Knox County Industrial School 66 out of 139 white pupils examined and 3 out of 10 colored pupils were found infected with trachoma. At the Episcopal Orphanage 1 out of 35 children examined was found to have trachoma. A brief report of these studies together with recommendations has been published in the Public Health Reports September 5, 1913.

Investigations of Pellagra.

The work on pellagra to which reference has been made in previous annual reports has been continued, the studies having been made at the marine hospital at Savannah, Ga., and in the field.

In the work of collecting statistics regarding the prevalence of pellagra a total of 30,000 return post cards were mailed to physicians in 11 States of the Union, these States comprising a large part of the area where pellagra prevails most extensively in this country. The data thus collected were compiled and published in the Public Health Reports of December 13, 1912, and July 25, 1913. These data have for the first time furnished a more or less accurate estimate of the size and extent of the pellagra problem in the United States, and the difficulty of their collection has emphasized the necessity of reporting cases of pellagra to health authorities.

In addition to the above, Surg. C. H. Lavinder, who has continued in charge of the work, conducted certain studies in laboratory and hospital. For this purpose, 13 cases of pellagra were admitted to the marine hospital at Savannah during the year. In addition to the ordinary clinical and therapeutic observations made on these patients in the wards, some new remedies were tried, some serological work was done, and also some bacteriological work. Further, monkeys have been injected with material derived from these patients, and some feeding experiments undertaken. The results of this work have not as yet been published.

Passed Asst. Surg. R. M. Grimm devoted the year to field work, and in working up the data thus collected. He collected data on about 1,400 cases during the year. The results were compiled and published in the Public Health Reports of March 7 and 14, 1913.

Dr. John Sundwald, who had spent a portion of the summer of 1911 in the Hygienic Laboratory on special studies of pathology, spent two months at the marine hospital at Savannah during the summer of 1912 making pathological studies on pellagra. Most of his time was spent in working up material which was on hand and had been collected by Dr. Lavinder at various times and places. This work was unavoidably interrupted.

The laboratory established at the marine hospital above mentioned for pellagra studies has been in steady operation, but on account of lack of funds its facilities have not been extended as rapidly as was necessary.

With the passage of the act of August 14, 1912, authorizing investigations of diseases of man, abundant authority was conferred for an extension of pellagra studies already begun. On account of lack of necessary appropriations with which to carry on this work, however, it has been hampered, but in the recent act making appropriations for sundry civil expenses the necessary funds were provided. It is accordingly expected that the work will be enlarged, and attempts will be made to confirm or disprove particularly recent important announcements in respect to the possibility of the transmission of pellagra to lower animals.

Investigation of Poliomyelitis in Buffalo and Batavia, N. Y.

On the appearance of an unusual number of cases of poliomyelitis throughout western New York in the summer of 1912, the State commissioner of health of New York requested the detail of an officer of the service to cooperate with the State and local authorities in an epidemiological study of the outbreak. In compliance with this request, Passed Asst. Surg. W. H. Frost was ordered, in August, to Buffalo, the seat of the largest outbreak reported at the time, and

Asst. Surg. J. P. Leake was subsequently detailed to assist him in the work, which was continued until November 1.

The investigation, which was outlined and conducted jointly with the department of health of the city of Buffalo, was centered specially on a detailed study of each of the 297 cases of poliomyelitis reported and verified in Buffalo, and of 26 cases in the town of Batavia. While visits were paid to adjoining localities and inquiries made, it was impracticable to make a systematic canvass of any cities except Buffalo and Batavia, or of the neighboring rural region.

In the investigation special consideration was given to the following points: Morbidity and mortality rates, prevalence of other diseases, course of the epidemic, topographic distribution, incidence in regard to character of population and environmental conditions, use of food and drink by patients, contact with infected persons, relation to school attendance, and evidence of insect transmission.

The study showed that in general characteristics and course the New York epidemic was similar to others previously studied.[1] Its origin could not be ascribed to purely local causes, as outbreaks of like severity occurred in other localities of the State at about the same time. It had no apparent relation to weather conditions, since other epidemics have occurred under different weather conditions, especially as regards temperature and rainfall. One of the most significant facts brought out was that in certain groups of the population (in certain wards and in the Italian population) where the epidemic developed earliest it subsided while still on the increase in other groups. The evolution of the outbreak was, therefore, to some extent, independent of such variations in weather conditions as took place between June and October. It seems that the infection was widespread, almost universal, passing successively over different areas of the city, attacking all or most of the susceptible individuals, and then ceasing in that particular section. It would be difficult on any other basis to account for the rarity of cases during August and September among those groups of the population which suffered most in June and July, in view of the fact that the chances of possible infection continued, both from infected neighbors and convalescent patients, in their midst.

The fact that only in a very small proportion of the cases was contact, direct or indirect, with previous cases demonstrated can not be considered sufficient to disprove the direct transmissibility of the disease from person to person. It serves, however, to prove that if the disease was commonly so transmitted, the recognized cases were relatively unimportant sources of infection, and other sources, most probably mild unrecognized cases and passive human virus carriers, played an important part in the transmission of the disease.

The wide distribution of cases seemed to indicate that if the disease was transmitted by biting insects, these likewise derived their infection from other sources than recognized cases; and that only a small proportion of the persons bitten developed the disease in recognizable form. While it is within the bounds of possibility that domestic animals or insects may act as infective agents, no proof could be obtained of their playing this rôle.

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[1] See previous annual reports.

The epidemic in Batavia was, in proportion to the population, more intense than in Buffalo, the rate of incidence of paralytic cases being in Batavia 187 and in Buffalo 63 per 100,000. The virulence of the disease, judging from the mortality rates, was, however, no greater in one place than in the other, the mortality rate being in Buffalo 14.5 per cent and in Batavia 13 per cent, or 3 out of 23 cases. The outbreak in Batavia was also distinctly later in its development, beginning in the latter part of August, two months after the beginning of the Buffalo epidemic. In Batavia the epidemic ran a much more rapid course, as it reached its maximum within three weeks after the onset of the first known case, and in another three weeks it had passed, while in Buffalo it took two months to reach its maximum development and almost the same time in declining. No evidence was obtainable tracing the origin of the Batavia epidemic to Buffalo, as only two of the patients were found to have been in Buffalo within a month prior to illness, and the earliest reported case had not been away from home for several weeks.

In the study of both epidemics the assistance of the health authorities and physicians of both Buffalo and Batavia proved most efficacious in the collection of the data desired.

The complete report of Passed Asst. Surg. Frost on these outbreaks has been published in Hygienic Laboratory Bulleton No. 90. In the same bulletin the data previously obtained in epidemics in Iowa and Ohio are given, and general conclusions are presented based on all the material assembled.

TEXARKANA, ARK.-TEX.

At the request of the State commissioner of health of Texas, Surg. Edward Francis was detailed on June 3, 1913, to investigate an outbreak of infantile paralysis in Texarkana, Ark.-Tex., and vicinity.

Fifty cases occurred in Texarkana or within 2 miles of the city limits; 46 cases occurred in Sevier and Little River Counties, Ark.; and 47 cases in Bowie, Red River, and Cass Counties, Tex. Of the 93 cases outside of Texarkana, 66 were in the families of farmers or in families living under farm conditions, and 27 were in the towns.

The seasonal prevalence of this outbreak is unusual, in that it occurred in early summer rather than late summer and fall. One hundred and twenty-four of the 143 cases had their onset in the 30-day period between May 20 and June 18. The first case was on April 5, and this was followed by 13 others before May 20 and by 5 after June 18.

In 129 of the cases the age was ascertained. Eighty-eight per cent were under the school age of 6 years. Sixty-two per cent were under 3 years of age. In 82 families in which the number and ages of the children in each family were learned, the total number of children was 315. In 62 of the 82 families the youngest child was attacked. In 14 out of the 82 it was the next to the youngest child. In one instance there were 3 cases in the same family. In three instances there were 2 and in each of the other 139 families there was but 1 case.

The legs were more frequently paralyzed than the arms. In 119 cases in which the part paralyzed was determined, the arms participated 42 times and the legs 98. Five of the 7 cases in which there was paralysis of the muscles of deglutition resulted fatally.

At the suggestion of Surg. Francis, the following regulations were put into effect in Texarkana for the control of the outbreak:

(A) All cases of the disease are to be reported to the health officer.

(B) The patient is to be confined to a compartment thoroughly screened against flies and so confined for a period of three weeks from the onset of the disease. Only physicians and nurses shall be permitted within the screened compartment.

(C) Members of the family and others who have been in contact with the patient are to be confined to the premises during the quarantine period, with the exception of the breadwinner. All visitors are to be excluded from the premises.

(D) Disinfection of all articles of clothing and eating utensils coming in contact with the patient is to be accomplished by boiling immediately after use.

(E) A terminal disinfection of the house with formaldehyde is to be made on lifting the quarantine at the expiration of three weeks.

(F) All parts of the premises are to be maintained in a sanitary condition.

A complete report of this investigation was published in the Public Health Reports of August 15, 1913.

SAN ANGELO, TEX.

In accordance with a request from the State and municipal health authorities, Surg. Francis proceeded on June 26, 1913, to San Angelo, Tex., to advise in regard to the poliomyelitis situation in that locality.

Six cases of poliomyelitis were seen by him in San Angelo and report obtained of three others.

Dr. Francis recommended that the same regulations previously adopted in Texarkana should be enforced in San Angelo, his recommendation being followed by the local authorities.

LABORATORY INVESTIGATIONS OF POLIOMYELITIS.

The announcement of Dr. M. J. Rosenau, formerly of this service and now connected with the Harvard Medical School, at the International Congress on Hygiene and Demography, regarding the successful transmission of poliomyelitis by the bite of the *Stomoxys calcitrans* (stable fly), excited the greatest interest among those concerned in the control of this disease. Steps were immediately taken in the Hygienic Laboratory to repeat the work reported by Dr. Rosenau.

It was found in the laboratory that it was possible, in a certain proportion of cases, to transmit poliomyelitis from monkey to monkey by the bite of the stable fly. Of the large series of experiments, involving the use of approximately 30 monkeys, positive results in the transmission of the disease were obtained in only three instances. These successful experiments were made in the fall of the year only, during October, and the unsuccessful ones were made subsequent to that time. It is possible that the season of the year had something to do with the success of the experiments; but from a consideration of the epidemiological data—especially the demonstration by a number of observers of the infectivity of the buccal and intestinal secretions from cases of poliomyelitis and from persons in contact with cases of poliomyelitis—it is more than probable that the fly is only an occasional transmitter of the disease.

A considerable number of experiments were made by Passed Asst. Surg. Frost to determine the infectivity of the dust collected from houses occupied by persons sick with poliomyelitis. All these experiments were negative.

INVESTIGATION OF MALARIA.

By direction of the bureau, epidemiological studies of malaria were begun by Surg. R. H. von Ezdorf in Alabama, as a preliminary to more extensive studies to be conducted in all the Southern States.

The studies related to the following points:

1. Species of malarial parasites.
2. Index of malarial infection in Mobile.
3. Effect of quinine on parasites.
4. Species of anophelines and their breeding places.

1. *Species of plasmodium.*—Examinations of the blood were made of all cases of malarial fever coming under observation at the United States marine hospital at Mobile, also of blood smears submitted by physicians in Mobile.

The cases treated at the United States marine hospital were sailors, most of whom are employed on vessels plying between Mobile and points on the Alabama and Tombigbee Rivers in the State, so that their infection must have been contracted in the State of Alabama.

The following species, in their order of prevalence were encountered: Plasmodium vivax or tertian type; Plasmodium falciparum or estivo-autumnal subtertian type; Plasmodium malaria or quartan type.

By far the greatest number of infections were of the tertian type. There were but few of the quartan type. At times, a mixed infection of tertian and estivo-autumnal was encountered, and only one of quartan and estivo-autumnal was seen, but these mixed infections occurred mainly toward the end of the season.

Cases of tertian and estivo-autumnal infections are to be encountered throughout the year; the quartan being so few in number, it is not possible to say what the seasonal prevalence for this type is. The quartans seen occurred toward the end or just at the beginning of the season.

2. *Index of malarial infection in Mobile.*—The studies made for Mobile, included blood examinations of persons resident in the city for a year or more. These persons, at the time of examination, were in apparent good health except in 4 who had stated that they were well except for a "slight headache," or "sore throat," or "feverish at times."

It was not practicable to obtain a splenic index in all cases, so that these studies do not include this information.

With the exception of 24 pupils attending a private school, and a few persons whose blood smears were submitted by physicians in response to a request by circular letter for such specimens, the large majority were of persons living in a portion of the city where rural conditions prevail—that is, near marsh land, poorly drained gutters, or where poor sanitary conditions around houses are to be found.

There were in all 146 such blood examinations made, and while so few are reported, yet these few give some indication of the extent of latent malarial infection which prevails in the community in question.

These were, according to age, sex, and color:

Age.	For March, April, and May, 1912.					For November and December, 1912.			
	White.		Colored.		Total.	White—Male.	Colored.		Total.
	Male.	Female.	Male.	Female.			Male.	Female.	
Less than 1 year				1	1				
1–2 years		3	1	1	5				
3–4 years	2	1	2	4	9			1	1
5–9 years	5	6	10	2	23		12	3	15
10–14 years	7	11	2	1	21	1	10	8	19
15–16 years	2	12	1		15				
17–20 years		9			9		1		1
21 years and over	9	7	1		17	2	5	3	10
Total	25	49	17	9	100	3	28	15	46

The examinations according to months and findings may be summarized as follows:

Months.	Examinations.	Estivo-autumnal.	Tertian.
1912.			
March	34	2	1
April	24	4	2
May	42		6
November	32	3	5
December	24	1 [1] 1	1
Total	146	[1] 11	15

[1] 1 mixed estivo-autumnal and tertian.

The previous history of attacks of malarial fever, given as several weeks to several years ago, were 41 positive and 59 negative of those examined during March, April, and May, and 38 positive and 8 negative of those examined in November and December.

There were 15 of the first 100 examined, or 15 per cent, of latent malarial infections for the early part of the year or season, and at the end of the season 11 latent infections in a total of 46, or 23.9 per cent, an apparent increase of about 9 per cent.

There were 15 latent cases among 69 colored persons examined, 6 with estivo-autumnal, 8 tertian, and 1 mixed infection; and 11 of the total of 77 white persons examined, 4 estivo-autumnal and 7 tertian infections.

Through the courtesy and assistance of Dr. E. W. Cawthon, blood specimens of 112 persons, living at or near Plateau, Ala., which is 3 miles from Mobile and connected by a suburban car line, with a population of approximately 2,000, of which about 80 per cent are colored, were obtained June 14, 1913.

Two, or 1.8 per cent, of all examined were found to be latent cases.

3. *Effect of quinine treatment on malarial parasites.*—It is worth noting that the administration of quinine, in solution, caused in all

cases treated a rapid disappearance of the active forms of parasites from the peripheral circulation, and always a rapid control of the active clinical manifestations of the disease within a few days after beginning the administration of this specific.

During the past year, several studies were made of the effect of quinine upon the presence of gametocytes in the blood, as follows: Two cases with tertian gametes, and two cases with estivo-autumnal gametes (crescents).

In the two tertian cases, which were under observation for a week before quinine administration was begun, the quinine had the prompt effect of causing the disappearance of the gametocytes from one within 36 hours after administration of 40 grains of quinine sulphate, and in the second within 4 days.

From previous experience and these observations it appears that estivo-autumnal infections should remain under treatment at least 30 days, and even then such cases will sometimes relapse.

4. *Anophelines and their breeding places.*—Inspections for breeding places for mosquitoes were made in and about Mobile during the year, and many breeding places were found in the unpaved and unimproved sections of the city. Anopheline larvæ were collected principally from gutters which were poorly drained. In making search for breeding places, two larvæ, one from a tin can, and one from a bottle, were found and hatched out and found to be Anopheles crucians. It must be added that these receptacles were found on the streets, and had grass growing in and around them.

Anopheles maculipennis and Anopheles crucians have been found. Anopheles maculipennis was found during the fall months of 1912, while Anopheles crucians was found throughout the year. An Anopheles crucians was caught on February 22, 1913, in the main business and paved section of the city, which is fully one-fourth mile from the river front. During May, 1913, after a long period of dry weather, there were found in several gutters larvæ of anophelines which were bred out and found to be Anopheles crucians. A crucians was also caught in May, 1913, in a house within the good residence section of the city. An anopheline larva was collected from a small filthy collection of water, in a ditch close by a house, at Plateau, Ala., on June 14, 1913. This larva lived two weeks, and did not reach the pupal stage in its development. No special search was made for mosquito larvæ at Plateau.

From the foregoing, it is seen that at the beginning of the season, that is, during spring time, which is at the beginning of anopheline mosquito flight, there was found to be 15 per cent of latent malarial infections of persons in the year 1912, whereas in the fall, at about the end of mosquito flight, there were 23.9 per cent of latent infections.

The mosquito population also increased as the season advanced and a noticeable reduction occurred during the winter months of December, January, and February.

The question of latent malaria is in this region probably the most important factor concerned in the spread of the disease.

The examination of 112 persons from Plateau, Ala., during June, 1913, would indicate that approximately 2 per cent of persons there have latent malaria. An examination in this region will again be made this fall to note any change.

There is no doubt that the indication for controlling and eradicating infection is the control or treatment of the carrier, in addition to eradication of mosquito breeding places in the vicinity of residences. With a fair reduction of mosquitoes and the proper treatment of the latent cases, a marked reduction if not the eradication of malarial fevers should be expected.

The conclusions of Surg. von Ezdorf, as the results of his studies, were as follows:

(1) All forms of malarial fever prevail in the State of Alabama in the following order of prevalence: Tertian, estivo-autumnal, and quartan.

(2) Latent malarial infections in a section of Mobile in 1912 had apparently increased about 9 per cent at the beginning of December over that of early months of the same year.

The malarial index in the town of Plateau, Ala., in June, 1913, was 1.8 per cent, or 3.33 per cent of the colored population who gave a history of previous attack of malaria.

(3) The colored race is a large factor in the spread of malarial infection, in whom the chronic or latent type of infection is proportionately greater than in the whites.

(4) Adults as well as children must be examined when determining the malarial index.

(5) Latent or known chronic cases of malaria should be treated vigorously with quinine for at least one month. If quinine is not tolerated, good hygiene and rest may bring about a spontaneous recovery.

(6) Every person who suffered an attack of malarial fever during one year should be advised to take prophylactic doses of quinine at the beginning of spring or summer months in the succeeding year, when the flight of anophelines begins, and continue this until the end of the season, November 1.

(7) Anopheles crucians mosquito prevails in Mobile throughout the year, and Anopheles maculipennis is also found during the summer and fall months.

(8) Mosquito breeding places are to be found in badly drained gutters, swamps, ditches; receptacles, such as cans and bottles, under certain conditions also serve as breeding places for anophelines.

(9) For the eradication of malarial fevers, it is necessary to institute a campaign for the proper and prolonged treatment of latent cases of malaria, as well as against the breeding of mosquitoes. The free distribution of quinine should be instituted.

An article by Surg. von Ezdorf in regard to the prevalence and geographical distribution of malaria in Alabama was published in the Public Health Reports of December 27, 1912.

FREE DISTRIBUTION OF QUININE.

Next to the elimination of mosquito breeding places, no measure has been more effective for the control of malaria than the treatment of the population affected or exposed to the disease. In a number of countries, such as Italy, Greece, and Algeria, the importance of this measure has been recognized officially, and free distribution of quinine at public expense is extensively practiced.

With a view to awakening interest in the subject and making people realize how relatively easy it is to gain immunity against malaria, the following circular was issued by the bureau on June 27, 1913:

> On account of the prevalence of malaria along certain of the rivers, lakes, and other bodies of water in the United States, and the liability to exposure of persons employed on vessels plying on such bodies of water, measures should be taken to prevent malaria infection or the development of the infection should it be contracted.
>
> The taking of quinine will largely prevent the development of malarial fever in those exposed. It is advised, therefore, that persons in malarial regions take one of the salts of quinine in 5-grain doses morning and evening every Saturday and Sunday during the season in which the disease prevails.
>
> Beneficiaries of the service may, upon application at a marine hospital office, obtain sufficient quinine to last one month for the purpose stated, and this supply may be renewed when necessary. Malaria is transmitted to human beings only by the bites

of infected mosquitoes. To guard against infection, therefore, the breeding of these insects should be prevented and living apartments should be screened.

There is little doubt that the general use of quinine as a prophylactic against malaria would result in a great diminution in the prevalence of the disease which is now imposing sanitary and economic burdens on the people in a number of places in the United States.

INVESTIGATION OF DENGUE IN FLORIDA.

In accordance with a request received from Dr. J. Y. Porter, State health officer of Florida, Surg. Joseph Goldberger was detailed to Florida on October 31, 1912, to confer with the State health authorities in regard to an epidemic of fever which was reported to be prevailing in that State.

According to the account of the State board of health, the fever had appeared early in the summer at Tampa, where some 10,000 cases were said to have occurred. The fever had swept through Gainesville and had been reported from St. Augustine and Miami. A few isolated cases were known to have occurred in Jacksonville, but according to the city health officer had not become epidemic. All these cases had occurred prior to Surg. Goldberger's arrival, but the prevailing disease was being reported at Key West at the time of his visit, and through the courtesy of Acting Asst. Surg. S. D. W. Light, he was enabled to see two or three cases which were found, as reported, perfectly typical dengue.

It was impracticable to get any definite data as to the number of cases that had occurred or were occurring, but it seems clear, nevertheless, that Florida had been visited by an extensive epidemic of dengue during the summer and early fall of 1912. The epidemic began early in July, probably in Tampa, and is known to have extended to St. Petersburg, Gainesville, Jacksonville, St. Augustine, Miami, and Key West. In the latter place the disease made its appearance in the latter part of October.

So far as could be ascertained, the disease presented nothing out of the ordinary except the occurrence of an unusually marked and extensive erythematous eruption.

INVESTIGATIONS OF HOOKWORM DISEASE.

During this last fiscal year the Hygienic Laboratory has continued its investigations of hookworm disease and its cooperation with the southern State health authorities and with the Rockefeller Sanitary Commission in the movement for the eradication of the disease, the activities of the service officers engaged in this work being devoted to research and technical matters.

The uniformly organized campaign is now being actively carried on in Virginia, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, Kentucky, Tennessee, and Arkansas, while Florida is carrying on an independent campaign.

The total number of persons treated for hookworm disease in 11 States by the agencies mentioned for the year 1912 is 238,755, giving an average of about 762 persons per day for every working day in the year. For this service the Rockefeller Commission expended for 1912 $184,671.60.

The rapid increase in the number of persons to whom treatment was distributed is seen from the following table:

Year.	Number of persons treated.	Average cost.
1910	14,423	$4.66
1911	140,378	1.05
1912	238,755	.77
Total and average cost	393,556	1.02

The rapid increase in the microscopic examinations shows not only the increased activity in this work, but also that the public at large is becoming more interested in the campaign and that the false sense of modesty in regard to fecal examinations is rapidly disappearing. The statistics are given in the following table:

Total number of microscopic examinations.

1910	14,789
1911	90,724
1912	326,951
Total	432,464

THE DEGREE OF INFECTION AMONG COUNTRY SCHOOL CHILDREN.

The campaign against hookworm disease has clearly brought out the point that the degree of infection varies in different counties and in different communities within the county. The records show a percentage of infection in counties ranging from 2.5 to 94. Of 158,555 rural children examined microscopically in 230 counties in 11 States, 78,572 children, or 49.55 per cent, were found infected.

Cooperation.—The present campaign against hookworm disease is a splendid example of the friendly cooperation of the local counties, the various States, the Rockefeller commission, and this service. Despite the number of organizations and elements involved the work is most harmonious and may well be taken as an example to be followed in fighting various other diseases.

The rôle played by the Public Health Service in this work relates almost exclusively to the technical side of the question, although help is also extended to the State boards of health in emergencies when the specimens submitted for examination are too numerous to be handled by the State laboratory forces. For instance, on two occasions this last year certain State organizations had so much work before them that they appealed to this service for aid; a delay in their work would have militated against the campaign, and on both occasions every available man in the Division of Zoology was put at work to assist in these emergencies.

Field work.—Nearly all of Prof. Stiles's time for about four months of this past year has been occupied in a special study of the children in five rural schools in one of the South Atlantic States, and for five months of the year he was occupied with work at the marine hospital in Wilmington. This time was spent in investigating certain phases of the hookworm disease and of other diseases spread under the same conditions that are favorable for the dissemination of hookworms. While the details of the field work are not given in the present report, they will soon be ready for publication and issue.

Special investigations.—Among the subjects that have been studied recently by the service in connection with hookworm disease, mention may be made of the following: (A) Effect of hookworm disease on the menstrual function; (B) Leichstern's method of judging the completeness or incompleteness of cure; (C) Treatment; (D) Blood pressure; (E) chemical workings of thymol; (F) Biological work on *Necator americanus;* (G) the subjective symptoms noticed in patients under thymol treatment.

SOIL POLLUTION.

In previous annual reports repeated references have been made to the soil pollution present in rural districts. In connection with the hookworm work the various State boards of health have brought out some remarkable statistics that are published in the third annual report of the Rockefeller Sanitary Commission. Special attention is invited to the following summary which is most significant in regard to the spread of disease in the United States:

Degree of soil pollution at farm homes.—For the 308 counties surveyed, the records show a sanitary index for counties ranging from 0 to 19.2 on a scale of a possible 100. A total of 103,346 farm homes taken at random in 308 counties scattered over 11 States have been inspected; of these, 50,637 have no privy. For the 103,346 homes the sanitary index, estimated as for a county, is 5.7 per cent.

Number privies—		
Type A, at 100 per cent	151	15,100
Type B, at 75 per cent	225	16,875
Type C, at 50 per cent	106	5,300
Type D, at 25 per cent	2,071	51,775
Type E, at 10 per cent	50,156	501,560
Type F, at 0 per cent	50,637	0
Total number homes examined	103,346	590,610
Sanitary index	per cent	5.7

The foregoing statistics are more extensive than those originally published by this service and show that the conditions are slightly worse than the original estimate, based upon a smaller number of observations. The thought that the sanitary index of 103,346 American farmhouses taken at random in 308 counties scattered over 11 States is only 5.7 on a scale of 100 is surprising and shows the necessity for improvement.

SANITARY PRIVY BULLETIN OF UNITED STATES DEPARTMENT OF AGRICULTURE.

The United States Department of Agriculture has shown its interest in this work, and at the request of the Secretary of the department Prof. Stiles and Surg. Lumsden of this service prepared a farmer's bulletin on the sanitary privy. This bulletin has had very wide distribution, up to January 1, 1913, 350,000 copies of the publication having been issued.

FULL-TIME COUNTY HEALTH OFFICER.

Attention was invited in the last annual report (see p. 35) to the importance of upbuilding local regulations and their enforcement by full-time health officers who shall give up their entire time to public health work and who shall not be permitted to engage in private practice. From the very nature of public health work which involves education and police powers, in addition to investigations, it is impossible to emphasize too strongly the value of a full-time health officer to any locality. Such an officer can accomplish for a given locality, with little complication and with less friction, many things that the Federal Government could not hope to do except with greater complication and very much greater friction.

The State Board of Health of North Carolina has taken up this subject, and it is exceedingly gratifying to learn that there are good hopes that North Carolina will have 10 full-time county health officers this coming fiscal year.

MEDICAL INSPECTION OF SCHOOL CHILDREN.

Anent to the hookworm work, the service has become interested in a number of public-health problems closely related to it, fully realizing their importance in regard to the control of uncinariasis and the improvement of the public health. With this general thought in view the service has arranged for a very thorough study of at least 4,000 school children in one of the counties of the Gulf Atlantic States. It is the purpose to examine at least 2,000 white children and 2,000 negro children; 2,000 boys and 2,000 girls. In addition to the regular inspection such as is conducted in other localities, it is intended to examine the children also for blood and intestinal parasites, combining the medical inspection with a mental inspection. The county to which the proposition was made for this scientific study accepted it most heartily. The work is beginning under very favorable circumstances, with hearty cooperation between the local boards of health and education and this service. It will probably be about two years before this investigation is completed. The plan involves a medical census of the county, a physical examination of the school children, a mental examination of the children, a study of the sanitary surroundings under which the pupils are living, a study of the schools themselves, and a comparison of the school records of the children.

The Public Schools and Public Health.

One of the most remarkable points about the public-health movement in recent years is the tremendously increased interest shown by the school teachers of certain of our States. In no part of the country is this interest shown more than in the Southern States. Virginia, North Carolina, Georgia, Alabama, Mississippi, and Louisiana in particular may be mentioned in this connection. One of the officers of the service who gives up practically his entire time to field work in the Southern States claims that the rural school teachers are his best allies and that they take a remarkably intelligent and enthusiastic interest in the work. He even goes so far as to say that the public-health movement in the school organizations in the South has gained such a tremendous headway that the members of the medical profession will soon find public-health agitation in the hands of the school-teachers unless the physicians show a much greater activity in local matters than they do at present.

This interest is one of the most hopeful signs of the times. The school-teachers come into daily contact with the children of a community much more than does the physician and it is they especially who notice the effects of poor health.

SANITARY SURVEY OF THE MISSOURI RIVER WATERSHED.

In the annual report for last year (p. 22) reference was made to the preliminary investigations of the lower Missouri River then in progress. A complete report of the investigation was published in Hygienic Laboratory Bulletin No. 89, the general result being summarized by Surg. A. J. McLaughlin as follows:

> There has been an undue prevalence of typhoid fever for years in every city taking its water supply from the Missouri River except St. Joseph, and St. Joseph had high rates in 1910 and 1911. The consistently high rates in winter and spring year after year indicate that the greatest factor in these high rates was the sewage-polluted Missouri River water, imperfectly purified.
>
> Previous to 1910 the older systems of purification were ineffective in times of great turbidity or of high bacterial content. Sedimentation without the use of a coagulant is not sufficient to purify the Missouri River water in time of gross pollution.
>
> Purification processes depending upon sedimentation are more effective in times of great turbidity, but this higher percentage of purification is nullified by the high initial bacterial content of the untreated water.
>
> Sewage pollution of the lower Missouri River is general from Sioux City to its mouth, while it is greater in the vicinity of cities and packing plants. It is also marked at points on the river far removed from cities. At such points, after many miles of stream flow from the nearest urban source (54 miles at Jefferson City or 23 miles at Quindaro), the B. coli content is still as high as 150 to 300 per cubic centimeter during certain months. This necessitates a high degree of purification in order to make Missouri River water safe.
>
> Filter plants have not been able at times to overcome the pollution of the Missouri, often for lack of sufficient sedimentation, but principally because of the lack of hypochlorite as a final process. The bacterial count and the B. coli content per cubic centimeter are at times so high in the Missouri River that with a filter efficiency of 98 per cent removed a dangerous effluent remains.
>
> The primary requisite to reduce the excessive prevalence of typhoid fever in this area is safe water supplies.
>
> The use of streams for the disposal of sewage is an economic resource and may often be employed without detriment to others; hence its absolute prohibition would be unjustifiable. Such use of streams is sound in principle and safe in practice when proper restrictive control is exercised.
>
> Although prevention of all pollution is impossible, the control of pollution is feasible and necessary. The discharge of sewage by cities should be under control, and disposal by dilution should be permitted, for economic reasons, up to the limit of permissible pollution.
>
> The permissible limit of pollution of a waterway can be fixed only after a careful study of the waterway, the uses which must be made of it and to which it is best adapted. The permissible limit of pollution allowing a reasonable use of the stream for the purposes for which it is best adapted must be fixed for each locality by the formulation of official standards for the waterway at that particular point. Such official standards should be made for each problem independently and separately, it being manifestly impossible to fix general standards of raw water to cover all cases without gross injustice.
>
> The condition of the Missouri River has reached a point where immediate control of pollution is necessary to prevent further impairment of the stream as an interstate source of water supply. Probably restriction of the present pollution would be unnecessary except at certain points, but further increase of this pollution should be carefully passed upon and permission granted only after most careful consideration. If

the pollution increases beyond the present conditions, too great a strain and responsibility will be placed upon the water-purification plants.

The pollution of rivers, streams, and lakes within a State may be controlled by State laws. The problem of the control of great interstate and international lakes and rivers is not so simple. They must be considered as a complete entity, and not piecemeal. The same laws or restrictions should apply to the Missouri River whether it be that part which separates Iowa and Nebraska or that which separates Kansas and Missouri. The problem of pollution of interstate and international waters is so broad and affects so many interests that it necessitates for its equitable and efficient handling a central directing authority independent of local influences or prejudices. This central authority must also have the power to deal with foreign countries and adjust international differences. It is difficult to secure uniformity of law in the various States, and uniformity of procedure under such law is almost too much to be expected. To treat the problem of pollution on these great interstate or international waterways with justice and equity to all concerned there is a necessity for Federal control.

COOPERATION WITH THE INTERNATIONAL JOINT COMMISSION.

When the International Joint Commission was organized according to treaty between the United States and Canada, its officers requested the advice of this bureau in the questions relating to the investigation of the pollution of boundary waters between the two countries. The chairman of the United States delegation on the commission, Hon. J. A. Tawney, was informed that all possible assistance would be rendered, and Surg. A. J. McLaughlin, who had made a preliminary survey of the Great Lakes (see p. 20, Annual Report for 1912), was detailed to attend the meetings of the commission for purposes of consultation.

At the request of the commission, Surg. McLaughlin was subsequently granted temporary leave from the service to become chief sanitary expert and director of field work in the proposed investigations undertaken by the commission. The service agreed, in addition, to cooperate in these investigations, and to this end two laboratories were installed at Buffalo, N. Y., and Detroit, Mich., and placed in charge of Passed Asst. Surg. Paul Preble and Asst. Surg. L. R. Thompson, respectively, for the purpose of analyzing about 3,000 samples of water which were to be taken at over 100 designated points on the Detroit River, St. Clair River, Lake St. Clair, Lake Erie, Maumee River, and Niagara River between April 1 and August 1. The Canadian authorities agreed to do a similar work on their side, and the State of New York volunteered also to assist by placing one or two laboratories in the field.

These investigations have for their object the securing of exact information as to the nature and extent of the pollution of the waters between this country and Canada, with a view to suggesting measures for controlling it. It is understood that the results of these studies will be made public by the International Joint Commission.

INVESTIGATIONS OF THE POLLUTION OF THE POTOMAC RIVER.

In a joint communication of October 8 from the governor of Maryland and the governor of Virginia, and in a communication of October 14, 1912, from the president of the Board of Commissioners of the District of Columbia, attention was invited to the importance of investigations to determine the extent of the pollution of the Potomac River, and requests were made that a comprehensive study of the subject be undertaken by the United States Public Health Service.

Authorization for such investigations being contained in the act approved August 14, 1912, and attention having been previously drawn to the subject during studies of typhoid fever, steps were taken through the Hygienic Laboratory to make an intensive sanitary survey of the entire Potomac River watershed.

In January a preliminary trip was made down the river as a means of planning the investigation. The services of Prof. W. T. Sedgwick, of the Massachusetts Institute of Technology, were secured to advise in respect to the scope of the studies, and it was determined that a very intensive survey would be required, involving a large number of water examinations, the samples to be taken regularly at many points along the river.

By the time the plans were completed it was expected that adequate funds would be available with which to carry them out, since the necessary estimates had been submitted for an appropriation. Delay in the passage of the sundry civil act, however, deferred temporarily the taking up of the studies, although the work was begun in a small way by taking advantage of the assistance offered by the State and District authorities.

In addition to a sanitary survey of the watershed, examinations of samples of water, both bacteriologically and chemically, have been undertaken. The bulk of these samples are being examined in the Hygienic Laboratory, but a branch laboratory has been established at Colonial Beach to examine samples taken on the lower river, and a branch laboratory may also be needed on the upper river as the studies are extended.

Preliminary surveys of the watershed have already been made, and systematic examinations of samples of water are being conducted daily. As the investigation progresses other problems will undoubtedly have to be considered, such as the effects of dilution and the natural agencies of purification upon the polluted water in given distances of stream flow, and the effect of the sewage pollution in reducing the dissolved oxygen in the water. The preliminary surveys have indicated also the necessity of considering the problem of typhoid fever and especially as it exists in rural districts.

STUDIES OF NUTRITIVE VALUE OF PASTEURIZED MILK.

On August 5, 1912, a milk station was opened at the Hygienic Laboratory for the study, in connection with the Bureau of Animal Industry, of the relative value of raw and pasteurized milk as a food for infants. During this year a total of 46 children have received milk for varying periods of time from the laboratory, the number now under supervision being 16.

Of the 46 children who received milk at the laboratory during the year 3 died, but these 3 had passed out of the control of the laboratory some time before death. Thirty-eight of these children showed significant gains in weight and only 4 of the whole number showed loss. Four are not considered in the above figures, as they received milk at the laboratory for a period in which only one weighing was had.

The studies contemplated have been considerably handicapped by the small number of infants available. Repeated efforts have been made to establish relations with some of the hospitals or foundling asylums so that a larger number of babies could receive the milk and under more exacting conditions; but such efforts have not been fruitful of results.

Supervision of Viruses, Serums, Toxins, and Analogous Products.

In the administration of the act of July 1, 1902, regulating the sale of viruses, serums, toxins, etc., 25 establishments were inspected, 11 licenses were renewed, and 6 new licenses and 11 supplemental licenses were issued. The issue of 3 licenses was still under consideration at the end of the fiscal year.

A list of the establishments holding licenses on July 1, 1913, was published in the Public Health Reports of July 11, 1913, and in the Treasury Decisions of July 22, 1913.

It is a gratifying fact that, although a great many samples of these products were examined in the Hygienic Laboratory, the number found to be contaminated or below potency was very small.

Manufacturers are constantly placing on the market new biological products the therapeutic efficiency of which has not yet been demonstrated. Certain other products are offered for sale which seem to be prepared and recommended for use with reference to no definite scientific principles. It seems desirable, therefore, that the department should be empowered, when the question of the issue of a license is before it for decision, to take into consideration the therapeutic efficiency of the products.

Instances of sudden death following the administration of antimeningitis serum have been reported, but some of the deaths have been attributed to the preservative used in the serum. This matter being one of great importance, an investigation has been begun in the Hygienic Laboratory. The studies will be directed toward the determination of the toxicity of serums containing different kinds of preservatives when given intraspinally and toward deciding on a preservative that may be used intraspinally without ill effects.

In consequence of reports of a considerable number of cases of tetanus following vaccination in different parts of the country, it was decided to examine in the Hygienic Laboratory numerous samples of virus of different makers and to make an exhaustive study of the methods of testing vaccine virus for the presence of tetanus spores. In addition to examining the small quantities of virus contained in the ordinary capillary tubes and on the vaccine points found in the market, virus was procured directly from the makers in 5 c. c. bottles, each of which represented a sample taken from the total yield of a calf. The virus furnished by a single calf will usually make between 8,000 and 10,000 vaccinations. The special examinations during the fiscal year covered the virus from 100 calves, or what would suffice for nearly 1,000,000 vaccinations.

For the detection of tetanus spores in vaccine virus a new technique was devised, which proved to have an efficiency of 100 when tested with artificially contaminated virus. In none of the samples of virus bought in the market and furnished by the manufacturers were tetanus spores found.

DISTRIBUTION OF ANTIRABIC VIRUS.

The number of patients treated at the Hygienic Laboratory for the prevention of rabies has been greater than for any other year since the treatment was made available there. During the year 118 persons were given the treatment at the laboratory.

In February, 1913, the first death from rabies among those who had received treatment at the Hygienic Laboratory occurred. This man had unusually severe bites on both hands, and he developed rabies a few days after completion of the treatment and died therefrom after an illness of about two days. Since the treatment was inaugurated at the laboratory on April 28, 1908, up to July 1, 1913, 523 persons have been given the treatment here. The single death among that number gives the remarkably low percentage of 0.19 per cent. Aside from this case of rabies there have been two cases of paralysis developed among the persons treated. Both of these, however, recovered.

During the year antirabic virus was sent on request as follows:

	Treatments.		Treatments.
Alabama	382	North Dakota	8
Arkansas	12	Oregon	13
Arizona	6	Canal Zone	12
Colorado	4	Porto Rico	8
Delaware	32	South Carolina	29
Illinois	66	Tennessee	69
Indiana	133	United States Army	25
Iowa	47	Virginia	124
Kansas	43	Washington	8
Kentucky	69	Wisconsin	29
Massachusetts	2		
North Carolina	232	Total	1,353

Virus to be furnished Army authorities.—At the request of the Surgeon General of the United States Army, arrangements were made by which, on request of medical officers of that branch, antirabic virus will be furnished for treatment of persons bitten by supposedly rabid animals. This arrangement was only effected toward the close of the fiscal year.

STUDIES ON RABIES.

The heads of 129 animals were received at the Hygienic Laboratory to determine whether the animals had suffered from rabies, as follows:

Dogs	112
Cats	7
Hogs	1
Unknown	1
Snakes	4
Cattle	3
Man	1

Of this number, 81 were positive and 34 negative; no examination of 15 was possible on account of the condition of the specimens when received at the laboratory.

The question of the improvement or modification of the virus sent out from the laboratory has been under consideration. Studies were begun of the relative efficacy as a prophylactic of the virus prepared, as is now the custom at the laboratory, with the carbolized product, and of the dried virus as prepared by Harris. The experiments, however, were not of a sufficiently conclusive nature to justify any change at the present time.

There is probably no activity of the Hygienic Laboratory which has exerted a greater influence throughout the United States than the demonstration by the laboratory of the feasibility of the preparation of antirabic virus for shipment over long distances. Previous to this demonstration it was necessary for persons desiring treatment to travel in many cases long distances to Pasteur institutes, but following the work of the Hygienic Laboratory, manufacturers of biological products have made such improvements that the virus is now prepard and shipped in such a condition that it can be safely used by the private physician.

AID IN ENFORCING WHITE PHOSPHORUS MATCH LAW.

In view of the provisions of the act of April 9, 1912, "to provide for a tax upon white-phosphorus matches, and for other purposes," the Commissioner of Internal Revenue requested the assistance of the bureau in determining by means of periodical inspections of factories and examinations of samples whether certain matches came under the provisions of the law. Plans were agreed upon between the two offices for the enforcement of the act, and in the regulations adopted by the Commissioner of Internal Revenue by virtue of the powers vested in him, the following describe the functions assigned to the Public Health Service:

> ART. 2. Section 1, of the act of April 9, 1912, defines white phosphorus matches as follows:
>
> "That for the purposes of this act the words 'white-phosphorus' shall be understood to mean the common poisonous white or yellow phosphorus used in the manufacture of matches and not to include the nonpoisonous forms or the nonpoisonous compounds of white or yellow phosphorus."
>
> Under the definition of white phosphorus as given in section 1, matches made of the nonpoisonous forms or nonpoisonous compounds of white or yellow phosphorus are not subject to tax, nor the manufacturers thereof to the operations of the law.
>
> ART. 3. For the purposes of determining which manufacturers of matches are subject to the provisions of this act, every manufacturer of matches will be required to file with the collector of the district in which his factory is located a statement, under oath, setting forth the names of materials used in the matches produced by him and to furnish samples of the materials named and of the finished product to this office and to the Surgeon General of the Public Health Service for examination. This shall be done whenever deemed necessary by the Commissioner of Internal Revenue and whenever a manufacturer may make a change in his process of manufacture.
>
> ART. 4. The Surgeon General of the Public Health Service shall cause to be examined in the Hygienic Laboratory from time to time samples of matches bought upon the open market, to determine whether they contain poisonous white or yellow phosphorus, and he shall report the result of such examinations to the Commissioner of Internal Revenue.
>
> ART. 5. If white or yellow phosphorus in any of its forms is used in the production of matches by the manufacturer, the Surgeon General of the Public Health Service shall cause to be made a thorough examination of the factory and materials entering into the production of matches, and a physical examination of the persons employed in such establishment, and he shall report his findings in the matter to the Commissioner of Internal Revenue.
>
> For the purpose of this investigation and examination any duly authorized officer of the Public Health Service shall have access to any match factory while in operation.
>
> ART. 6. Upon report of the findings of the Surgeon General, the collector of the district wherein the factory is located will be notified whether the manufacturer is exempt from the operations of the law, and, if not, the manufacturer will be required to register, file notice, bond, etc., as hereinafter provided.

Section 2 provides:

"That every manufacturer of white phosphorus matches shall register with the collector of internal revenue of the district his name or style, place of manufactory, and the place where such business is to be carried on; and a failure to register as herein provided and required shall subject such person to a penalty of not more than five hundred dollars. Every manufacturer of white phosphorus matches shall file with the collector of internal revenue of the district in which his manufactory is located such notices, inventories, and bonds, shall keep such books and render such returns in relation to the business, shall put such signs and affix such number to his factory and conduct his business under such surveillance of officers and agents as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, may by regulation require. The bond required of such manufacturer shall be with sureties satisfactory to the collector of internal revenue and in the penal sum of not less than one thousand dollars; and the sum of said bond may be increased from time to time and additional sureties required at the discretion of the collector, or under instructions of the Commissioner of Internal Revenue."

Aid to Other Branches of the Government.

Health officer, District of Columbia.—During the fiscal year a large number of specimens of water were examined at the Hygienic Laboratory on request of the health officer of the District of Columbia, and reports were made thereon. These specimens consisted chiefly of samples taken from taps and shallow wells in the District, especially those used as a source of supply by schools located in the suburbs. At the request of the health officer of the District the director of the laboratory appeared in court on two occasions to give testimony in connection with the prosecution of dealers alleged to have sold unwholesome milk.

Civil Service Commission.—Some representatives of the laboratory have assisted the Civil Service Commission in grading the papers of applicants for technical positions in the classified service.

Department of Agriculture.—At the request of representatives of the insecticide board of the Department of Agriculture, a number of samples of coal-tar disinfectants were examined in the division of pharmacology of the Hygienic Laboratory to determine their toxicity in connection with the statement upon the label of those preparations that they were either nontoxic or nonpoisonous. It is believed that the data thus obtained may be used by the board in enforcing the law relating to these preparations.

Studies of Health Laws.

In the last annual report, page 39, mention was made of analyses of laws which had been prepared and published. This work has been continued and a manuscript is now in press containing an analysis of the laws and regulations relating to the control of communicable diseases in the United States. This manuscript, which represents a comprehensive study, contains also copies of the laws themselves and a number of important court decisions bearing on them.

There has also been made a digest of laws and regulations enacted during 1912 and 1913 relating to the possession, use, sale, and manufacture of poisons and habit-forming drugs. This digest, together with copies of the laws and regulations, was published in the Public Health Reports of October 10, 1913.

At the request of the secretary of the special public health commission appointed by the governor of New York to recommend legislation for the improvement of public health conditions in that State, Asst. Surg. Gen. J. W. Kerr was directed, February 6, 1913, to confer with the commission regarding health organization and administration. Several conferences were held with the secretary, and a brief statement submitted. It is understood that as a result of the work of the commission, a new law was enacted by the New York Legislature extending the powers and duties of the State health authorities in public health work.

A new health law having been enacted by the Legislature of Arkansas, the State health officer requested the detail of an officer to advise with the State board of health regarding the preparation of regulations in accordance with the provisions of the law. Surg. R. H. von Ezdorf was accordingly detailed, March 26, 1913, to cooperate in this work. He devoted two weeks to this work, and the board subsequently adopted the code of regulations which had been prepared in conference.

Cooperation with State health authorities in these matters affords opportunity of encouraging uniformity in public health administration. Studies of health legislation have thus become an important duty. Not only is it desirable to examine existing legislation, but there is need of cooperative investigations of the extent of enforcement of public health laws. At the request of the State Board of Health of Maryland, therefore, studies are being undertaken of public health administration in that State. On request of their respective health authorities, it is expected that these studies will be extended so as to include other States.

Hygienic Laboratory.

The increase in the work of the laboratory has paralleled the growth of the service and its more extended field in public health work. The increase of the appropriation for maintenance for the fiscal year 1913 has furnished additional facilities for research work. The present needs and the amount of work done are reviewed below. A large number of investigations performed by officers of the laboratory have, in view of their special importance, been considered under separate headings in other parts of this report.

Personnel.—The personnel attached to the laboratory at the end of the year consisted of a director, an assistant director, professor of zoology, professor of pharmacology, professor of chemistry, 13 commissioned medical officers, 9 technical assistants, 1 artist, 2 pharmacists, and 31 attendants, or a total of 61. This is an increase of 5 over the number attached to the laboratory at the end of the last fiscal year.

During the year 26 medical officers have been attached to the laboratory for varying lengths of time. Some of these officers have been detailed to the laboratory for purposes of instruction, and others for the investigation of special problems.

Course of instruction.—A course in sanitary bacteriology was given to five officers during the spring (January to May). On account of the limited time available the course included only the more important pathogens, namely, anthrax, typhoid-colon group, plague, cholera, tuberculosis, diphtheria, pneumonia, tetanus, Malta fever and syphilis. Particular emphasis, however, was given to fundamental technical methods and to diagnostic procedures, the former including cultural and staining methods, biological reactions, and animal inoculations; the latter including the diagnosis of rabies and the preparation of the Pasteur treatment, practice in the isolation of typhoid bacilli from feces and blood, the isolation of cholera from feces and water, diagnosis of plague, and the bacteriological analysis of water and milk. The important animal parasites were briefly reviewed by groups, special attention being given to methods of study.

In addition, the student officers were given informal lectures on epidemiology and epidemiological investigations and on vital statistics.

During the progress of the course there were frequent conferences at which the individual student officers were required to present concise résumés of the important theories of immunity.

Instruction to public health officers.—It is to be regretted that during the past year no representative of a State or municipal board of health availed himself of the advantages of the Hygienic Laboratory for purposes of instruction. There are obvious benefits to be obtained from the detail of representatives of these boards to the Hygienic Laboratory for instruction. In this way they could be put in touch with the latest developments in laboratory work as they relate to the public health and become familiar with the efforts being made by the service to cooperate with State and local health authorities.

Library.—The library of the laboratory now contains about 3,000 books and 2,000 reprints. In addition, there are over 60 technical journals received at the laboratory, many of these being weekly publications. These journals are in English, French, German, Spanish, and Italian. The need for a librarian has been referred to in previous reports. In connection with the investigations of special problems it becomes necessary to collect the literature of the problem under investigation and a librarian would be of great assistance in this respect.

Moreover, the library contains a number of valuable publications, which, on account of there being no librarian, are liable to be lost. In addition, the laboratory makes use of the facilities of other libraries and it is necessary that a record be kept of the books thus obtained so that they may be accounted for and promptly returned.

Buildings and grounds.—Congress recognized the need for an additional building at the laboratory for the housing of animals, disinfecting experiments, etc., by the appropriation of $25,000, which became available at the beginning of the fiscal year 1914. Plans for this building are now being prepared by the Supervising Architect, and it is hoped that the contract may be awarded so that the present frame buildings used for these purposes may be removed and the animals housed in a building which can be better heated during the winter. The removal of these temporary frame buildings and the completion of the grading of the grounds will, for the first time, render the reservation on which the Hygienic Laboratory is situated favorable in comparison with the adjoining grounds belonging to the Medical Department of the Navy.

Additional laboratory space.—The growing necessity for an additional laboratory building to be used for research work is becoming more and more apparent. A fireproof building similar in architecture to the present building should be located on the laboratory grounds about 200 feet south of the present laboratory. This building, in addition to those portions devoted to the research work, should contain accommodations for from 10 to 15 patients, so that when a particular disease is being studied cases may be admitted to the laboratory for observation.

Hospital facilities.—The necessity for having hospital facilities attached to research laboratories has become so generally recognized that all the larger research laboratories, such as the Rockefeller Institute for Medical Research, the Memorial Institute for Infectious Diseases, the Pasteur Institute, and similar institutions, have provided these facilities. There would be great advantage in having accommodations of this kind in Washington as an aid to the studies of pellagra being conducted by the service. In the studies of measles conducted at the laboratory during the past fiscal year one of the greatest handicaps was the lack of clinical material. If facilities had existed at the laboratory for the admission of patients suffering from the disease, studies could have been conducted in a more satisfactory and scientific manner and the results obtained would have been on a more comprehensive and satisfactory scale. The same is true in connection with the studies on infant feeding now being conducted at the laboratory and a number of other problems which have been under investigation or which it is contemplated to take up in the near future. It is estimated that such a building, including fittings, would cost $175,000.

Need of branch laboratory at Ellis Island.—Attention was invited in last year's report to the importance to the Hygienic Laboratory of the establishment of a branch laboratory at Ellis Island, N. Y. In one investigation, for instance, it was desired to continue the study of measles previously made at the laboratory, but on account of the difficulty of obtaining material in Washington these studies could not be made. If a branch laboratory was maintained at Ellis Island, material such as this would be available, and in fact a considerable amount of work could be carried on at such a laboratory.

There is a large amount of material constantly available at Ellis Island which would afford a most fertile field for the study of problems concerned with the public health.

Lectures.—During the year members of the laboratory corps delivered lectures before the Naval Medical School. At the request of the professor of hygiene of the John Hopkins University the second-year medical class of that school was given a series of short talks and demonstrations of the Widal test in the laboratory.

Examinations for tuberculosis.—During the year 8 Government employees, as compared with 19 in 1912 and 14 in the fiscal year of 1911, were examined at the request of their administrative superiors to determine whether they were suffering from tuberculosis. Seven of the eight presented positive evidence of tuberculosis, only one being negative.

Physical examinations.—In addition a number of employees in various branches of the Government have been examined to determine their physical condition with reference to other diseases.

AID TO REVISION COMMITTEE OF THE PHARMACOPŒIA.

The cooperation and assistance of the laboratory with the revision committee of the Pharmacopœia, referred to in previous reports, has been continued during the last fiscal year. Three members of the revision committee belong to the laboratory personnel, and one of these three is a member of the executive committee, which has immediate charge of the revision of the Pharmacopœia.

A statement of the methods for the determination of boiling and melting points and solubilities has been prepared at the laboratory to be incorporated in the pharmacopœia, and a considerable amount of the research work in the division of pharmacology in regard to biological standards of certain drugs, such a digitalis, strophanthus, etc., has been made available for use by the revision committee.

As a result of work done in the laboratory it is probable that biological methods for the standardization of drugs will for the first time be recognized in the Pharmacopœia.

DIVISION OF PATHOLOGY AND BACTERIOLOGY.

In addition to the subjects mentioned under separate headings[1] work has been continued or begun in the division of pathology and bacteriology along the following lines:

Disinfectants.—On account of the death of Passed Asst. Surg. McClintic early last year, the study of the phenol coefficient of commercial disinfectants has been to some extent interrupted; but a large number of samples have been examined for the General Supply Committee and reports made thereon.

At the suggestion of the director, Dr. Hale made a study of the toxicity of certain phenol disinfectants purchased on the open market and also evolved a suggested method of standardization. The need for this study was very apparent, as many of the manufacturers were placing on the labels of their disinfectants the statements "nonpoisonous," "nontoxic," "harmless," etc., whereas as a matter of fact many of these preparations were almost as harmful as pure phenol.

Wassermann reactions.—During the year service officers were informed that the laboratory was prepared to perform the Noguchi modification of the Wassermann reaction of specimens submitted to the laboratory for the purpose. In the fiscal year just ended 159 specimens from service stations were examined, of which 64 gave a positive Noguchi reaction, 87 negatives, and 8 doubtful.

DIVISION OF ZOOLOGY.

International Commission of Zoological Nomenclature.—Cooperation with the International Commission on Zoological Nomenclature has been continued through the Hygienic Laboratory, Prof. Stiles serving as secretary of the commission. This commission is composed of 18 professional zoologists elected from the world at large and serving as an international court of appeals for nomenclatorial questions upon which differences of opinion arise. The Smithsonian Institution has furnished the secretary with a private secretary for this work. Fifty-six opinions have thus far been rendered. They are published by the Smithsonian Institution and distributed free to the zoological profession.

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[1] See typhus fever, cholera, poliomyelitis, pasteurized milk, antirabic virus, antityphoid vaccine, biological products.

Index catalogue of medical and veterinary zoology.—The Division of Zoology of the Hygienic Laboratory and the Division of Zoology of the Bureau of Animal Industry have continued to cooperate in the preparation of an index catalogue of medical and veterinary zoology. The author's catalogue has now been published in full. Of the subject catalogue, the volumes dealing with the *Trematoda* and the *Cestoda* have been published and the division is now working on the *Nematoda* and on the host catalogue.

Determination of zoological specimens.—The Division of Zoology has continued to make zoological determinations of animal parasites for physicians, boards of health, etc., and a large number of such determinations as aid in diagnosis have been made.

Publications.—A number of articles have been written for the Public Health Reports and for various medical and educational journals dealing with practical problems of sanitation and the technical side of hookworm disease and Cochin China diarrhea.

Hookworm campaign and investigation.—The chief attention of the Division of Zoology this year has been occupied with the technical side of hookworm disease in connection with the eradication campaign carried on by the State boards of health as described in another portion of this report.

DIVISION OF PHARMACOLOGY.

Research work.—Research work has been carried on on a number of lines. Work on the standardization of a number of drugs, especially thyroid, suprarenal, digitalis, and ergot has been continued. The work on the thyroid in which samples of the glands of sheep and other animals were examined biweekly throughout the year has confirmed the earlier results showing that there is a definite seasonal variation in the iodine content of these glands; at some seasons there was three times as much iodine as at other seasons. This is a question of considerable scientific, and also of practical, importance since it is proposed, in accordance with suggestions made by this division, to require a definite iodine content for United States Pharmacopœia preparations of thyroid. The results obtained here have been confirmed in England. Further studies were made upon physiological tests for thyroid substance; a number of derivatives of acetonitril and other nitrils (some of which were made for the first time here and others of which were made by new and improved methods) were tested. Acetonitril, as was discovered in this laboratory some time ago, is the best and probably the only trustworthy test for thyroid. A new method for the determination of the active principle of commercial suprarenal glands has been developed and made available to the committee of revision for inclusion in the United States Pharmacopœia.

Standardization of drugs.—Work has been continued on the physiological standardization of digitalis, strophanthus, and ergot; some of this was done in cooperation with the committee of revision of the Pharmacopœia and the committee on physiological assay of the American Pharmaceutical Association. In a recent official examination by the department of the interior of Austria of proprietary preparations of digitalis, the method described in Hygienic Laboratory Bulletin 74, "Digitalis standardization and the variability of crude and of medicinal preparations," was adopted as the official method. The leading American manufacturers have recently made radical changes in their methods of marketing preparations of ergot; thus several are putting them out in small packages with the date after which they should not be used placed upon the label. The work of this division showing the desirability of such methods has undoubtedly been an important factor in bringing about these reforms. It is highly desirable that work along these lines be continued and extended to other drugs, notably the preparations of the pituitary gland which are in an unsatisfactory condition.

Thymol substitute.—Extensive studies have been made upon the biology of the larvæ of the hookworm (*Necator americanus*) and the effect upon these larvæ of sunlight, high and low temperature, dryness, various salts, disinfectants, etc., as factors in preventing the spread of the disease. Many experiments were made with drugs (some of them new) proposed as substitutes for thymol in the treatment of hookworm infection; various modifications of thymol were also tried in the hope of finding a more satisfactory drug than thymol itself. Although the results so far have been largely negative, these experiments have thrown some light upon the classes of compounds which are efficacious. An extensive series of experiments has been carried out on the manner in which thymol is altered in the body and excreted; this has involved the development of new methods for determining thymol in the excreta. This work, which will probably throw light upon the toxicity and mode of action of thymol, is being continued. A member of the division accompanied Dr. Stiles on one of his trips in the South and studied the effects of hookworm infection and of its treatment by thymol upon the blood pressure and hemoglobin of more than 100 children.

Work on the analysis of the physiological condition in anaphylaxis has been continued; considerable work was done in this connection on the effects produced by the subcutaneous and intravenous injection of sera. Recently an investigation into the possible toxic effects of the preservatives added to therapeutic sera, especially those which are injected subdurally or intravenously, has been begun.

Coal-tar disinfectants.—The work begun during the fiscal year 1911–12 on the toxic properties of commercial coal-tar disinfectants has been completed. The results of this investigation, which included about eighty preparations, together with a proposed method for determining the toxic values of substances of this class in terms of the toxicity of phenol to be known as the toxicity coefficient, has been published as Laboratory Bulletin 88. The results showed that although nearly all of the disinfectants of this class are less toxic than phenol, none of them can properly be called "nontoxic" (as was the almost universal custom), and that the claims made for them in this respect were a distinct menace to the health of those who used them. Many of the manufacturers are now modifying their statements as to the nontoxicity of such preparations.

Digest of comments on the Pharmacopœia of the United States and on the National Formulary.—The preparation of the material for the Digest of Comments has been continued, and during the year the manuscript for Laboratory Bulletin 87 was prepared and submitted for publication. Laboratory Bulletin 84, containing a digest of the comments appearing during the year 1910, was distributed and has been the subject of very favorable comment on the part of both medical and pharmaceutical journals of this country and of Europe and others interested in the subject from either administrative or scientific standpoints.

The digest of laws relating to the manufacture and sale of poisons and habit-forming drugs.—During the year Public Health Bulletin No. 56 containing a digest of laws and regulations in force in the United States relating to the possession, use, sale, and manufacture of poisons and habit-forming drugs has been published, and was liberally commented upon in various journals. The majority of the commentators expressed their appreciation of the publication as a valuable contribution toward the securing of greater uniformity in the laws of the several States designed to regulate the sale and use of the drugs concerned. The number and nature of State laws relating to poisons and habit-forming drugs that were enacted during the winter of 1912 and 1913 have already made this compilation out of date, and the Pennsylvania Pharmaceutical Association, appreciating the value of such a compilation as a factor in securing more uniform laws and regulations, adopted a resolution, at the annual meeting in June, 1913, asking the Surgeon General of the United States Public Health Service to issue revised editions of this digest of laws annually or biennially, so as to keep the book both practical and up to date. During the year considerable interest was evolved in a proposed Federal antinarcotic law, and the several branches of the drug trade organized what has come to be known as the "National Drug Trade Conference." Three representatives from each of the national organizations interested in the manufacture and sale of drugs met in the city of Washington on January 15, 1913, to discuss a bill, introduced into the House of Representatives by Mr. Harrison, of New York, providing for registration with the collectors of internal revenue of all dealers in, or producers of, certain drugs. One of the members of the division of pharmacology was requested to represent the American Medical Association at this conference, and in the course of discussion on the then existing bill was in position to offer a plan for an official order blank which was to serve, in place of the proposed complicated system of stamping preparations, to keep accurate records of the disposition or sale of habit-forming drugs. The members of the Drug Trades Conference unanimously indorsed the proposed modification, and the scheme is included in the act H. R. 6282, which passed the House of Representatives on June 26, 1913. The importance of the subject of habit-forming drugs, from the standpoint of public health, is obvious in view of the fact that conservative estimates place the number of persons in the United States addicted to the use of these drugs, and consequently rendered not only inefficient but often criminal, as considerably exceeding those suffering from typhoid fever.

Examination of drugs; miscellaneous analyses.—Several hundred samples of various kinds were analyzed or examined. These included a number of samples of drugs received from the purveying depot to determine whether they conformed to the Pharmacopœia standards;

a large number of samples of thymol, some of which were alleged to have caused death, received from various State boards of health; various vaccines, sera, and other biological products; several samples of milk and urine; certain alleged remedies for pellagra; a plant stated to have caused the death of some children, etc. Work of this character has considerably increased during the past year.

Aid to other departments of the Government, etc.—The division of pharmacology has been called upon by several other bureaus for assistance or cooperation; thus analyses of the compounds used in the manufacture of matches to determine if the latter complied with the law regulating the sale of white phosphorus matches have been made for the Bureau of Internal Revenue; memoranda have been prepared for this bureau as to whether certain alcohol-containing preparations could properly be regarded as bona fide medicines; the professor of pharmacology spent six weeks with the professor of chemistry making an examination of the radio activity of the waters of Hot Springs, Ark., for the Interior Department; he also gave testimony for the Department of Agriculture in a case under the pure-food law; the toxicity of a number of coal-tar disinfectants was determined for the insecticide board of the Department of Agriculture; a list of drugs and the preparations most liable to deterioration was prepared for the medical service of the Indian Bureau.

Considerable work has been done by members of the division in connection with the revision of the Pharmacopœia and the National Formulary. The revision of these two books is now actively under way and printing will probably begin during the coming year. Two members of the division are members of the committee of revision of the Pharmacopœia and one is a member of the committee on National Formulary. Considerable work has been done on the physiological assay of drugs in connection with the subcommittee of the committee of revision; similar work was done in connection with a committee of the American Pharmaceutical Association. A table of solubilities of pharmacopœial compounds was compiled for the ninth revision of the Pharmacopœia; the statements for the text respecting the solubility of each compound in the Pharmacopœia was also prepared. This work was based largely upon previous work and compilations of such data done in the division. Similar work has been done in connection with the determination of melting points of pharmacopœial compounds.

Two members of the division are members of the Council on Pharmacy and Chemistry of the American Medical Association and have taken an active part in the work of this council, especially in connection with the preparation of a small work entitled "Useful Remedies," which a number of teachers in medical schools and several members of State licensing boards are using as a basis for instruction and examination in materia medica and therapeutics. This is part of an international movement to restrict the attention of students and of candidates for licensure to practice medicine to really important drugs. The book published by the Council on Pharmacy and Chemistry entitled "New and Nonofficial Remedies" is being thoroughly revised and the information contained therein will in future be of greater interest to the practicing physician. A member of the division of pharmacology was a member of a special committee of five to prepare a series of articles for the Journal of the American

Medical Association on "Bacterial Vaccine Therapy; its indications and limitations," the purpose being to present an impartial discussion on this greatly misrepresented and commercially exploited subject; the articles have been reprinted in pamphlet form and are having a wide circulation.

DIVISION OF CHEMISTRY.

The work of the division may be reviewed under the following headings: Analytical work, research work, special investigations, and lectures:

ANALYTICAL WORK.

Drug analysis.—Fifty-two samples of drugs were examined as to their purity and freedom from adulteration. These drugs were representative samples of those which were purchased for use in the United States marine hospitals. This work represents one branch of the routine analytical work carried out in the division of chemistry. When the division first undertook this work, a large percentage of the drugs examined had to be rejected on account of the impurities which were found in them. Some of the drugs were even found to contain harmful and dangerous ingredients, e. g., comparatively large amounts of arsenic. While we can not say definitely that these impurities in the drugs were due to intentional adulteration or simply to carelessness on the part of the manufacturers, the fact nevertheless remains that ever since the first rejections the quality of the drugs supplied to the United States marine hospitals has been continually improving. Nearly all of the drugs examined this year were found to be of a very high grade of purity, and the very few which did not comply with all the requirements of the United States Pharmacopœia were rejected rather because they lacked in the quantitative requirements than on account of qualitative deficiency.

Milk analysis.—In connection with the experimental work on infant feeding which has been in progress at the Hygienic Laboratory the division of chemistry has done the analytical work required. This work has been a daily routine and has required the daily attention of one of the men in the division. In this connection the division has carried out 265 determinations of the fat in milk.

Water analysis.—The division of chemistry has also done work on water analysis during the year. Samples of water which were sent for examination by various health officers and others interested in the sanitary condition of the waters in question were analyzed in the division and reported to the director. Altogether 12 samples of water have been analyzed during the year. On 10 of these the complete sanitary analysis was carried out; on the remaining 2 complete percentage analyses of the mineral constituents were made.

Preparation and analysis of the carbolic-acid standard for disinfectants.—The division prepared and analyzed from time to time the carbolic-acid standard for disinfectants. In this connection samples of phenol, which were intended to be used in the preparation of this standard, were examined as to their purity and freedom from the higher cresols.

Preparation of analytical reagents and standard solutions for the division of pathology and bacteriology.—The division of chemistry was called upon to prepare a number of analytical reagents and standard solutions for use in the division of pathology and bacteriology. Chief among these were Griess's sulphanilic acid and alphanaphthylamine reagents which are used in testing for the presence of nitrites and standard solutions of potassium hydroxide which were required in the preparation of various media.

Miscellaneous analyses and preparations.—During this year the division was called upon to examine vaccine points, human milk, and "mammala." The division also prepared several grams of pure tryptophane.

RESEARCH WORK.

Work done during this year is represented in the following communications either published or ready for the press:

(1) The action of potassium amide on thallium nitrate in liquid ammonia solution.

(2) Potassium ammonocuprite.

(3) Potassium ammonomagnesate.

(4) Ammonoborate, ammonostrontiumate, and ammonocalciumate of potassium.

(5) Potassium ammonosodate.

(6) Potassium ammonoargentate.

Research work was also done in connection with the drug analyses. It has been shown that the tests for purity of the quinine salts of the United States Pharmacopœia are faulty and need revision. The division of chemistry has, therefore, commenced an investigation which has for its object the finding and perfecting of an improved method which will be free of the faults of the present method. A method has already been devised which is very easy and simple in operation, but which has not yet been tested out experimentally in all its details. A few difficulties have been met which probably are not insurmountable, but which for lack of time and stress of other work have not yet been solved.

Likewise in connection with the preparation of pure tryptophane, to which reference has already been made, some research work had to be done. Owing to the fact that it is only a comparatively short time since this substance was first isolated in a pure condition and the fact that the yield is still comparatively very small, there still remain a number of problems which have for their object the simplification of the method and the improving of the yield. On account of the importance of tryptophane in certain biological studies its need in the preparation of media for the bacillus pestis and its proposed use in certain fields of medicine it seemed desirable to solve these problems. Several interesting points have been discovered during its study in the division, which render the process simpler and tend to improve the yield. Several interesting facts were also discovered which are of interest from the theoretical as well as practical point of view. This study is still in progress.

An investigation was carried out on the radioactivity of the waters of Hot Springs, Ark. In connection with this special investigation several special pieces of apparatus had to be constructed in the division. After considerable work of preparation had been carried out the chief of the division made a special trip to Hot Springs and there established a temporary laboratory. About a month was required for the experimental part of the investigation. Considerable additional time was then required in summarizing and studying the experimental results obtained and in preparing the report.

In connection with certain questions affecting the public health, which primarily came under the jurisdiction of the Department of Agriculture, the chief of the division was occasionally consulted and gave the required assistance. In this connection the chief of the division made two special trips to New York during the year for the purpose of aiding the pure-food officers in keeping out of the country certain adulterated teas. A very strong fight was made in the courts by the importers and expert testimony by chemists of high reputation was required in order to convince the courts that the contentions of the importers were wrong. This testimony was given by the chief of the division before the proper courts in New York.

Assistance was rendered to the United States Civil Service Commission in answering questions relating to chemistry and in the examining and grading of certain papers.

Assistance was rendered in the international movement, which has for its ultimate object the establishment of uniform figures for the physical constants in chemistry. A considerable number of papers were abstracted and the abstracts forwarded to those in charge of the work.

In compliance with a request made by the War Department that a report be furnished as to the food value of the infant food known as "mammala," as compared with condensed milk, the division made the required investigation.

PUBLIC LECTURES.

The public lectures given by the chief of the division during this year have been received with high appreciation, the demand for them being much greater than it was found possible to grant. As evidence of the fact that these lectures were highly appreciated, mention may be made of the fact that all the organizations under whose auspices the lectures were held were willing to pay all the expenses involved, so that the service did not have to spend anything on this account. Thirteen public lectures were given during this year before chemical societies and scientific associations.

Leprosy Investigation Station.

During the greater part of the year the laboratories at both Honolulu and Molokai have been in operation. No changes have been made in the personnel of the station. The assistant director and the acting assistant surgeon have carried on work at the Honolulu laboratory as in previous years, while the director has spent the major part of his time at the laboratory at Kalawao, on the island of Molokai, visiting the Honolulu laboratory as often as seemed necessary—approximately once each month.

There are material advantages in carrying on part of the work at Molokai at present. The proximity to a better supply of pathological material suitable for the foundation of laboratory studies than is available in Honolulu is a distinct gain. This material is secured through the courtesy and cooperation of Dr. W. J. Goodhue, medical superintendent of the leper settlement. In some respects it would be better to have patients in the service hospital, but the present arrangement works satisfactorily. The facilities for keeping laboratory animals at Kalawao are far superior to those in Honolulu. Indeed the limited space in the latter place was one of the prime factors in transferring part of the work to Kalawao.

Scientific work.—At the beginning of the fiscal year 11 cases of leprosy were under treatment at the Kalihi laboratory. Two of these died, one of tuberculosis and one of chronic nephritis with cardiac complications; one was discharged (returned to the board of health), and four new cases were admitted for treatment during the year. On June 14, 1913, these patients were transferred to the board of health for transportation to Molokai. They had been under treatment for a longer period than they are usually permitted to remain at Kalihi, and it was thought best to secure other patients with earlier manifestations of the disease. It is expected that new material will be available early in the new fiscal year.

Biological therapy.—Treatment of patients has been given as in previous years. Vaccine treatment (using the chromogenic cultures available) was discontinued after what was regarded as a fair trial, some of the cases having received injections for considerably over a year with practically no change in the condition of any of them. It should be said, however, that when the vaccine treatment was discontinued it seemed that their condition grew distinctly less favorable.

Work with serum from a horse immunized to *B. lepræ* has also proved disappointing and has been discontinued for the present at least. When one considers the nature of the disease there really seems to be at present no good ground for expecting much from vaccine therapy or from serum treatment with the biological agents available. This was realized while the work was being carried on, but it appeared wise to try everything that appeared feasible.

At the present time attempts are being made to extract from the organisms that have been cultivated from leprous lesions soluble products that may be used for immunizing purposes. This work has not progressed far enough to justify any expression of opinion as to what may be expected of it.

While efforts are being made to secure an effective agent for biological therapy patients are being treated with the usual medicaments employed in leprosy. Chaulmoogra oil in the form of intramuscular injections is being given to several patients, excellent results being claimed from its use by others.

Lepra bacillus, isolation of.—Throughout the year efforts to isolate acid-fast bacteria or other organisms from the tissues of lepers have been continued. Several strains of the usual chromogenic acid-fast variety have been isolated and one remarkable nonchromogen, which will be referred to again, has been isolated by Asst. Director Clegg. Work at this laboratory and elsewhere has tended to throw doubt upon the etiological relationship of the chromogenic organism isolated from lepers as being the cause of the disease or at least the only factor required to bring about infection. Indeed it is not beyond the mark to say that the field for research into the causative agent is still open. It is remarkable how different are the results obtained by different workers at different places and even by the same workers at different times.

Animal inoculation.—Attempts to infect animals have been continued throughout the year. Practically the only success has been with the nonchromogenic organism mentioned above. While the relation of this bacterium to leprosy is questionable, it is of great interest in being a pathogenic acid-fast organism that is in no way related to the tubercle bacillus. It is fatal to a considerable proportion of laboratory animals even in moderate doses, but unfortunately death usually occurs too early to permit of the development of distinct lesions. In a few of the animals that have survived long enough alopecia and ulcerative lesions have been found, but these sometimes occur under other conditions.

A large number of very young animals have been inoculated with various cultures and with the tissues from lepers, the idea being that as leprosy in human beings is so often acquired in early life it might be found that very young laboratory animals were susceptible, but the results were uniformly negative. Various observers have reported successful inoculation of animals after preliminary "sensitization." Several attempts to produce infection in this way have been made, but entirely without success.

There is perhaps no field of research in which more questionable results have been published than in connection with leprosy. If workers would defer publication of results long enough to verify them thoroughly, there would be vastly less misleading literature on the subject. This applies especially to the animal inoculation phase ot the subject, but it holds almost equally true for the therapeutic side.

The results of animal experimentation have been discouraging, but when one recalls that syphilis, which only a few years ago was thought to be even more certainly noninoculable for lower animals than leprosy, can now be transmitted with comparative regularity there is no ground for despair.

The work with rat leprosy has been hampered by the extremely low virulence of the strain in use. Recently a new strain, which it is hoped will prove more infective, has been obtained from the Federal laboratory in San Francisco.

Additional work has been done in attempting to detect the leprosy bacillus in ecto parasites of man, but in no case have organisms been found other than that mentioned in the last annual report of the station.

Serum reactions.—The fact that a large proportion of lepers give the Wasserman reaction just as cases of syphilis do is one of the puzzling problems of the disease. So far as we know the causative agents of the two diseases are entirely dissimilar, yet the antibodies react in the same manner to a given antigen. With the purpose of throwing additional light on this interesting question a series of lepers, known to give the Wasserman reaction, were inoculated with "luetin," a preparation made from the *Treponema pallidum*, but with a negative result in every case. If further experience confirms this work we will have the interesting circumstance of a disease giving one of the biological reactions of syphilis but not the other.

Tuberculosis complicating leprosy.—During the year the director, while assisting in the routine treatment of lepers at the Molokai settlement, was struck by the exceptionally large proportion of cases that sought surgical relief on account of suppurative axillary or inguinal and femoral adenitis. Therefore a systematic study of all of these cases was begun with the view of determining if possible their etiology. The results were striking and surprising; every enlarged gland of this sort was found to be due to the tubercle bacillus. Cultures of Koch's bacillus have been isolated from 10 such cases. Further experiments showed that the bacillus corresponded to the human type of the organism. This latter finding was something of a disappointment, as it was felt during the preliminary steps of the work that if what seemed to almost amount to an epidemic of tubercular glands could be shown to be due to the bovine type of the bacillus prophylactic measures would be comparatively simple.

Immunity.—A very large number of immunity experiments have been carried out for the purpose of ascertaining the relation of the various members of the group of acid-fast bacilli to each other and their relation to human leprosy and to rat leprosy and the organisms found in these diseases. The results do not admit of being summarized at the present time, but it is hoped that when the work is completed some definite information on the subject will be available.

Acting Asst. Surg. Hollmann has examined the blood drawn from the veins of 13 lepers and found a few acid-fast bacilli in 3, a much smaller percentage of positive results than several writers report. This work is still in progress.

Studies on the relation of the acid-fast bacillus isolated from lepers to various germicides have been carried out. The results have been so irregular that it is impossible to say just what the resistance of the organism is.

Statistical studies.—The following statistical studies have been made during the year:

A careful examination was made of all of the data available showing the risk incurred by healthy adults associating with lepers at the Molokai settlement. The results indicated that there is a very definite though not a large risk. Perhaps the most striking thing shown by the study was the fact that there was a very much larger percentage of infection among Caucasians than among the natives, notwithstanding the fact that usually the former did not live in the same house with the lepers while the latter did. This study was made in collaboration with the medical superintendent of the leper settlement.

A study of the records for several years, supplemented by personal observation, seems to indicate that the statement generally made, and the belief that is so widely held, that pulmonary tuberculosis is extremely common among lepers, did not apply to the Molokai settlement. In fact, the data indicates that probably it is less common among the inmates than among the general population of the islands. Whether the general impression as to the frequency of lung tuberculosis among lepers is not well founded or whether the conditions that prevail at Molokai are different from those elsewhere is not known.

Fecundity of lepers.—The third study of a statistical nature dealt with the fecundity of lepers at the Molokai settlement. Here again the facts elicited did not agree with the generally held views. It is usually stated that lepers are generally sterile. The data showed beyond doubt that the birth rate at the settlement during the last 13 years was comparatively little below that for the island population in general.

Aside from the purely leprosy studies a search has been made for the presence of ova of animal parasites in the stools of lepers. So far (20 cases) none have been found. This work was undertaken in connection with the general study of the prevalence of intestinal parasites in the islands.

Carbon dioxide snow in treatment.—Mention was made in the last annual report of the success alleged to have been attained by the medical superintendent of the territorial leprosy hospital at Honolulu in the treatment of leprosy by the use of ordinary medicinal agents, especially carbon dioxide snow. During the year just closed several lepers have been discharged from the hospital after this treatment. Cordial relations exist between the laboratory staff and the gentleman, Dr. Wayson, who has treated the cases at the Territorial hospital, and at the latter's suggestion the methods he employs will be tried both at the service laboratory at Kalihi and at the station at Kalawao.

COOPERATION WITH HAWAIIAN AUTHORITIES.

During the year Surg. G. W. McCoy, the director of the leprosy investigation station, continued to serve as sanitary adviser to the governor of Hawaii, his duties requiring a number of trips to various parts of the territory. Surg. McCoy reports an absence of serious epidemics and a general improvement in sanitation. One of the present needs in the Territory seems to be the establishment of a traveling laboratory, and the employment of an epidemiologist to assist in handling such outbreaks of disease as may occur in different localities.

Plantation sanitation is one of the most important problems in the islands, and the majority of the owners, especially in the case of the larger plantations, seem inclined to comply with the requirements of the Territorial board of health.

Plague studies.—A trip was made by Surg. McCoy to the Hamakua coast of the island of Hawaii in December, 1912, for the purpose of studying an outbreak of plague in the village of Kukuihaele. Two cases had occurred prior to the visit. It seemed likely that the infection had been acquired at the schoolhouse in the town, as seven dead rats had been found near that building about two weeks before the human cases occurred. Two pet rabbits kept in the school yard had died about the same time. There was no proof that any of these animals had died of plague as but one or two were examined, and they were reported as negative.

After giving the matter careful study the following recommendations were made by Dr. McCoy:

(1) Rat catching, which was general over the plantations, should be confined practically to the villages, camps, and the cane fields immediately adjacent to human habitations. This seemed advisable, as there is no doubt that with the resources available it would be quite impossible to make any impression on the great number

of rats in the cane, therefore it would be better to concentrate the efforts at the points where the greatest protection would be afforded.

(2) Encourage the keeping of dogs and cats in the camps and villages in order that the presence of these natural enemies might deter rats from coming near habitations.

(3) The distributing of guinea pigs in cages throughout the villages and camps, in the hope that these little rodents might acquire the disease before any human beings became infected, and serve as danger signals to the rat-catching force, that special attention was required in a particular locality.

Since Dr. McCoy's visit a considerable number of plague rats have been found and several human cases have occurred. What is needed urgently in this district is the constant presence of an officer familiar with plague work, in order that proper supervision may be given the rat-catching force and that epidemiological studies may be carried out. Most of the human cases present cervical buboes or are of the pneumonic type of the disease. The problem presented does not differ from that of squirrel plague in California in any essential manner. The area involved is smaller and the number of human cases of plague that occur is larger.

Public Health Exhibit.

The demands upon the bureau for the preparation of exhibits which may be used in educating the public in the principles of hygiene continue to increase. Unfortunately, however, the available material is inadequate to meet the requests for it, and in most cases, therefore, opportunities to serve a public need have to be ignored.

Attention has been called in previous annual reports to the fact that in no better manner can the Federal Government serve the public health than by placing exhibits, which may serve as object lessons in sanitation, in the hands of local authorities, civic associations, etc., which may use them to advantage in their respective localities. The cost would not be much, while the results would be very valuable to the entire nation.

NEED FOR A MUSEUM OF HYGIENE.

Through lack of funds, while the bureau has been conscious of the importance of the subject, the question of exhibits has not been given the attention it deserves. At all the great national exhibitions the bureau has been represented by sanitary exhibits especially assembled for this purpose. When the exhibition had terminated there has been no place to keep properly the materials, and they had to be boxed up and stored away in warerooms. Not only do the exhibits deteriorate by being thus kept, but their usefulness as an educational means is nullified during that time.

Were a suitable place in the national capital provided, these exhibits could be kept in public sight all the time, and thus become of great assistance in promoting the public health through the lessons conveyed to visitors, tourists, etc. While the materials now on hand are rather limited, increase to this number could be made by means of small periodical appropriations requested from Congress, and manufacturers of sanitary devices would be glad to leave their products in exchange for the advertising gained.

The museum would not only be an institution bringing credit to the nation, but could also be made the center for the preparation of exhibits, not only for local and State events, but also in the case of national and international exhibitions which this country is invited to attend.

ELEVENTH ANNUAL CONFERENCE OF STATE AND TERRITORIAL HEALTH AUTHORITIES.

In accordance with the provisions of the act of Congress approved July 1, 1902, the eleventh annual conference of State and Territorial health authorities with the Public Health Service was held in Minneapolis, Minn., June 16, 1913. Twenty States and one Territory were represented by one delegate each. The following subjects were discussed: Committee report on morbidity statistics; committee report on sanitation of public conveyances; committee report on cerebrospinal meningitis; committee report on typhoid fever; committee report on uniform quarantine procedure; cooperation in public health matters. As a result of these deliberations, a number of resolutions were adopted and the text for a model law for the notification of the occurrence and prevalence of certain diseases was approved by the conference. A copy of this model law for morbidity reports was published in the Public Health Reports June 27, 1913, and distributed to State health authorities. The transactions of the conference are being prepared for publication as a Public Health Bulletin.

FIFTEENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

In accordance with a joint resolution of Congress the President of the United States extended an invitation for the holding of the Fifteenth International Congress of Hygiene and Demography in Washington September 23–28, 1912. The organization and conduct of the congress were intrusted to an executive committee and a committee on organization designated by the State Department. The Surgeon General of the Public Health Service was a member of both of these committees, and Surg. J. W. Schereschewsky was a member of the committee on organization. It having been decided to hold an exhibit in connection with the congress, this latter officer was also designated as director of the exhibition.

The work of the congress was conducted in sections, the Surgeon General of the Public Health Service being president of Section VII, devoted to the hygiene of traffic and transportation, and Asst. Surg. Gen. J. W. Kerr acted as secretary.

The executive work of the congress was in the hands of Dr. John S. Fulton, secretary general, who also has charge of the preparation of the transactions of the congress for publication.

The benefits already derived from holding this congress in the United States are many. It permitted of an exchange of views by delegates from many countries regarding methods and practices in public-health work. It offered opportunity for an exposition of the present status of public-health advancement in this country, stimulated greater interest in sanitation, and emphasized in a measure the steps which are necessary to improve hygienic conditions.

Representation at Meetings of Scientific and Sanitary Associations and Congresses.

During the year officers were detailed to the following meetings of scientific and sanitary associations and congresses:

Tri-State Medical Association of Oregon, Washington, and Idaho, Portland, Oreg., July 5–6, 1912.

Minnesota State Medical Association, Duluth, Minn., August 14–15, 1912.

International Congress on Applied Chemistry, New York City, September 6–13, 1912.

International Congress on Hygiene and Demography, Washington, D. C., September 23–28, 1912.

Missouri State Medical Association Exhibition, Sedalia, Mo., October 1, 1912.

Association of Military Surgeons of the United States, Baltimore, Md., October 1–4, 1912.

National Congress on Pellagra, Columbia, S. C., October 2–4, 1912.

American Association for the Study and Prevention of Infant Mortality, Cleveland, Ohio, October 2–5, 1912.

National Conservation Congress, Indianapolis, Ind., October 21, 1912.

Great Lakes International Pure Water Association, Cleveland, Ohio, October 23–24, 1912.

Medical and Chirurgical Faculty of Maryland, Cambridge, Md., November 12–13, 1912.

Southern Medical Association, Jacksonville, Fla., November 12–14, 1912.

Lake Michigan Sanitary Association, Milwaukee, Wis., November 25, 1912.

Second National Conference on Housing in America, Philadelphia, Pa., December 4–6, 1912.

Southern Surgical and Gynecological Association, Old Point Comfort, Va., December 17–19, 1912.

New York Milk Committee, New York City, February 5–6, 1913.

Annual Conference on Health and Public Instruction of the American Medical Association, Chicago, Ill., February 24–26, 1913.

Association of American Medical Colleges, Chicago, February 24–26, 1913.

Indiana Sanitary and Water Supply Association, Indianapolis, Ind., February 25–26, 1913.

Interstate Agricultural and Industrial Congress, St. Joseph, Mo., March 6–8, 1913.

Third National Drainage Congress, St. Louis, Mo., April 10–12, 1913.

Conference of National Public Health Organizations, New York City, April 12, 1913.

Bacteriological Society, Boston, April 25, 1913.

Third Annual Conference of Washington State, County, and City Health Officials, Spokane, Wash., April 28–29, 1913.

Conference of Committee on Milk Standards called by the New York Milk Committee, Richmond, Va., May 2–3, 1913.

American Society of Tropical Medicine, Washington, D. C., May 6–7, 1913.

National Association for the Study and Prevention of Tuberculosis, Washington, D. C., May 8–9, 1913.

American Association for Promoting Hygiene and Public Baths, Baltimore, Md., May 13–15, 1913.

Pure Food and Health Exposition and Sanitary Congress, Greenville, S. C., May 19–24, 1913.

Southwest Virginia Medical Association, Roanoke, Va., June 3–4, 1913.

Association of Surgeons of the Southern Railway, Old Comfort, Va., June 13, 1913.

Annual Conference of State and Provincial Health Officers of North America, Minneapolis, Minn., June 17–20, 1913.

American Medical Association, Minneapolis, Minn., June 17–20, 1913.

Annual Conference of State and Local Health Authorities of Kansas, Lawrence, Kans., June 24–25, 1913.

Summer School of the South, Knoxville, Tenn., six weeks beginning June 24, 1913.

MARITIME QUARANTINE.

TOTAL INSPECTIONS.

During the fiscal year ended June 30, 1913, the United States Public Health Service inspected a total of 12,797 vessels at the domestic and insular quarantine stations and at foreign ports. Of this number, 4,346 were fumigated or disinfected either on account of actual infection or for the destruction of disease carriers, such as rats and mosquitoes. Passengers and crews to the number of 1,571,284 were also inspected to determine whether they were infected with any of the diseases quarantinable under the Treasury regulations.

Quarantine operations during the summer have been active under two general headings, one being the work of eradicating rats from vessels and the other being special precautions against the introduction of yellow fever from Mexican ports into the ports of the United States.

In connection with the rat-eradicative work, 1,737 vessels have been fumigated at the United States quarantine stations during the fiscal year just ended. This does not include the number of vessels fumigated by State and local quarantine authorities in compliance with our national quarantine policy.

Anticipating the appearance of yellow fever in or near certain of the coast cities of Mexico (bordering upon the Mexican Gulf) the usual quarantine measures against the introduction of this disease into the United States were instituted early in the season. The subsequent appearance of yellow fever in certain localities in Mexico has justified these precautionary measures. Neither plague nor cholera has in itself caused special quarantine activity during the year.

The disease plague was eradicated both from the ports of Habana, Cuba, and San Juan, P. R.

RAT QUARANTINE.

The work of eradicating rats from vessels has been steadily growing in volume and effectiveness by the requirements as to fumigation of vessels arriving from the following groups of ports, namely, those of South America, including the river ports, the West Indian ports, the African ports, including the Azores, Canary Islands, Cape Verde Islands, and Madeira, and finally all the ports of Asia, including those of the Straits Settlements, Japan, the Philippine Islands, and the Malay Archipelago.

GULF QUARANTINE STATION.

The greater portion of the 122 vessels fumigated during the year was for rat destruction alone. Of the vessels entering quarantine the previous year approximately 15 per cent were fumigated; for the year just ending the percentage was above 55. Proportionally the number of rats secured—880 for the 122 vessels—is not as great as during the previous year, and there are two explanations for this. First, many of the vessels treated had been fumigated but a short time before at some other station, and it was not expected that the rat census would be as heavy; secondly, vessels were fumigated as they came without regard to rat population. Ships engaged in the West India trade, which have for the last 12 months been systematically treated, have been noticeably free from rats, while vessels from which large numbers were secured give no history of recent fumigation. One small vessel which had not been at a wharf in 20 months yielded 49 rats, while from a single lifeboat of another 14 were taken.

HAWAII.

During the year more attention than ever was paid to the fumigation of vessels for rat eradication, and more weight was given to a careful search of storerooms and other parts of a vessel than to a recent certificate of fumigation.

Vessels fumigated for rat quarantine.—One hundred and eighty-two vessels were fumigated at Honolulu, 50 at Hilo, and 1 at Koloa for the purpose of destroying rats, with a resulting yield of 555 rats, which were classified as follows: Mus norvegicus, 34; mus alexandrinus, 162; and mus rattus, 337, from which it would appear that either the rattus and alexandrinus are more common in these islands than the norvegicus or that they are the best sailors of the family.

The vessels fumigated for the purpose of rat eradication were classified as follows:

(1) Vessels from foreign ports.
(2) Vessels bound for United States ports.
(3) Vessels engaged in interisland trade.

The difference in rat yield for the year between vessels of similar tonnage that are sheathed and unsheathed is well shown in the following table:

Date.	Unsheathed.		Sheathed.	
	Steamship Korea.	Steamship Siberia.	Steamship Tenyo Maru.	Steamship Chiyo Maru.
1912.				
July	0		140	
August		9		126
September		0	11	
October	0			82
November	0	3		35
December			6	
1913.				
January				88
February		0	24	
March	0			
April		0	35	75
May	0			58
Trapped	0	4	84	97
Total	0	16	300	551

The regular passenger liners plying between mainland ports and the islands were fumigated at regular intervals at San Francisco and Seattle during the year and these vessels are practically rat free, for only 95 rats were obtained from 9 vessels as a result of 40 fumigations during the year.

Seventy-one sailing vessels carrying lumber from mainland ports to the islands were fumigated prior to departure with the result that only 56 rats were obtained.

Those vessels plying to the island of Hawaii were, owing to the increase of plague there, required to be fumigated every 30 days, while those vessels plying to ports of the other islands were fumigated every two months. There are 17 steamers engaged in this trade, and they were fumigated 108 times, with a resulting rat yield of 294 rats during the year. The regular fumigation of these vessels is considered a most important protective measure in that it keeps down the rat population, and as these vessels go alongside of the mainland steamers to transship their cargoes of sugar there is thus less chance of rats passing from one vessel to another.

Rats in baggage.—In the disinfection of the baggage of the immigrants arriving from Europe on March 30, 1913, a trunk that had been broken during the voyage was found to contain a nest with two live rats which were killed. This incident illustrates the ease with which rats may be transported from a vessel to shore.

MANILA, P. I.

The animals killed during the carrying out of the work in connection with rat quarantine are shown in the following table:

Animals destroyed.	Manila.	Cebu.	Iloilo.
Rats	1,804	162	2,448
Mice	619	75	130
Cats	2	0	0
Lizards	78	0	39
Scorpions	21	0	0
Quarts of roaches	2,448	736	63
Quarts of red ants	267	0	7
Gekkos	25	0	0
Large spiders	131	0	36
Centipedes	2,019	0	85

Daily dock inspection and reports.—The inspection of the wharves and piers which was instituted a few years ago has been continued throughout the year. The daily report, submitted by the inspecting officer covering all the vessels at the piers and the manner in which vessels carried out the antirat and other regulations, shows that more difficulty seems to be encountered each year as commerce increases with both vessel and pier employees in carrying out the regulations regarding the placing of rat guards, removal of gangways, and other simple precautionary measures. By invoking the aid of the penalty clause improvement is being brought about. Frequent inspections of the piers show that the rat-proof construction has been successful. The few rats that gain access to them from time to time are promptly caught by the cats that are constantly kept there for that purpose. At Manila foreign vessels do not berth in the river. At Iloilo, where the foreign vessels come up the river into the center of the city, and at Cebu, where quays along which vessels berth are in close proximity to the business section of the city, the danger of rats gaining admission is very great.

SAN FRANCISCO, CAL.

During the year fumigation of vessels was carried out in accordance with the instructions issued by the bureau from time to time.

But little difficulty was encountered in enforcing the fumigation regulations, the agents of the various vessels fully appreciating the reasons and necessity for such measures. When vessels were not completely discharged at this port and carried cargo for other American ports, arrangements were made to have the fumigation carried out elsewhere under the direction of representatives of the service. In such instances the agents of the vessels were required to forward a copy of the certificate of fumigation so that a check could be kept upon all vessels touching at other American ports after having entered San Francisco.

Considerable assistance was rendered this station during the year by the service plague suppressive office in San Francisco.

The necessary inspections were made by employees of the service engaged in enforcing plague suppressive measures in San Francisco. Similarly, these service employees in San Francisco frequently searched vessels after fumigation, classified the rodents killed, and sent them to the plague laboratory for examination. In this way an accurate count was made of rodents killed and their laboratory examination insured.

There are good reasons for believing that routine fumigation (consisting of treatment of the holds, forecastles, storerooms, and steerage quarters) is quite sufficient under ordinary conditions. Repeated fumigations of vessels treated in this way either are negative or result in the finding of very few rats. Furthermore, when expertly located traps are set on a vessel after the completion of fumigation but few if any rodents are caught.

The frequent requests for fumigation of local vessels is particularly noteworthy. It is now generally recognized by the commercial interests that fumigation is an excellent procedure, not only for the destruction of damage-inflicting rodents but also for the elimination of the smaller vermin (cockroaches, bedbugs, etc.).

A considerable portion of the work of this station consists of the necessarily limited fumigation of oil-carrying vessels. Owing to the nature of the cargo carried, fumigation of the holds is unnecessary, thus confining the process to the forecastles and storerooms. Upon several occasions objection has been made to the open-pot method of fumigating such vessels because of the danger of fire. As a result it has become necessary to resort to the cumbersome method of pumping the sulphur gas from the fumigating hulk, which process has been expensive both to the service and the vessel. It has been suggested that oil tankers might be so rat-proofed as to do away entirely with fumigation. Air ports could be screened, doors protected by heavy, self-closing screen doors, while openings around pipes, etc., through which rats might pass, could be closed, just as a building on shore might be rat-proofed. In addition, it would seem advisable to set traps of known efficiency at regular intervals or to acquire several good rat-catching dogs or cats for permanent use on the vessels. The suggestion appears worthy of careful consideration and development.

For some time it has been realized that the reports received immediately after fumigation do not represent the real results in the number of rats killed. This is borne out by the fact that returning vessels frequently report the discovery of additional dead rats after leaving port. This state of affairs is due to several uncontrollable factors: (1) Rats frequently crawl into inaccessible places to escape the sulphur fumes and die there; (2) it is not justifiable from an economical standpoint to detain a vessel which is ready for dispatch while a thorough search is made; (3) it is expensive from an administrative standpoint to detail sufficient men to make a quick and complete search of a large vessel, perhaps only after waiting a considerable time for the gas to clear from the holds and compartments.

During the year 215 vessels were fumigated with sulphur and 3,374 rats killed, of which 54 were mus norvegicus, 1,393 mus alexandrinus, 489 mus rattus, 1,232 mus musculus, and 343 unidentified.

REPORTS FROM THE NATIONAL QUARANTINE STATIONS.

During the fiscal year ended June 30, 1913, at the various stations in the United States a total of 7,821 vessels were inspected, including 1,737 disinfected either for the destruction of mosquitoes as a precaution against the introduction of yellow fever or for the destruction of rats and other vermin as a precaution against plague.

In addition 820 vessels were spoken and passed, making a grand total of 8,641 vessels and 599,955 passengers and crews passing under the observation of the service at ports in continental United States.

Following are the summaries of the operations at the various quarantine stations:

Alexandria (Va.) quarantine.—Acting Asst. Surg. Arthur Snowden in charge. Two vessels, carrying 60 members of crew, were inspected and passed.

At Alexandria, Va., the quarantine inspection is also made of vessels destined to Washington, D. C.

Eastport (Me.) quarantine.—Acting Asst. Surg. John E. Brooks in charge. Seven hundred and ninety-six steamers and 61 vessels have been inspected and passed. These vessels carried 50,881 passengers and crew. There have been no cases of quarantinable diseases either among the passengers or crews.

Portland (Me.) quarantine.—Surg. H. S. Mathewson in charge. Two hundred and sixteen steamers and 43 sailing vessels were inspected and passed. These vessels carried 31,707 passengers and 14,902 members of crew.

Nine vessels from ports infected with plague were disinfected for the destruction of rats.

Four vessels had smallpox aboard upon arrival as follows:

	Case.
American schooner *Edward B. Winslow* from Baltimore, Md., Dec. 26, 1912	1
German steamship *Frankfurt* from Hamburg, Germany, Apr. 5, 1913	1
American schooner *City of Augusta*, from Philadelphia, Pa., June 6, 1913	1
American schooner *Alice M. Lawrence*, from Philadelphia, Pa., June 20, 1913	1

These vessels were disinfected and all contacts vaccinated.

Of interest during the year has been the great increase in the number of immigrants arriving at this port, the number rising from 14,775 in 1912 to 26,421 in 1913.

Providence quarantine.—Surg. S. B. Grubbs in charge. Thirty steamers and 13 sailing vessels were inspected and passed. These vessels carried 3,128 crew and 20,371 passengers.

The functions of the United States Public Health Service at the port of Providence, R. I., embrace quarantine operations, immigration inspection, medical treatment of sick or disabled American seamen, and the visual and physical examination of pilots and others.

Delaware River quarantine.—Philadelphia, Pa., Surg. W. G. Stimpson in charge. On March 16, 1913, the quarantine service of the Delaware River was placed under the charge of the officer stationed at Philadelphia, Pa., and the boarding and inspection of vessels was thereafter done at Marcus Hook, Pa., instead of at Reedy Island, Del. This action was taken in response to a request from the Maritime Exchange of Philadelphia in order that the double inspection of vessels on the Delaware River, one at Reedy Island by the national quarantine officers and the other at Marcus Hook by the State quarantine officers might cease, and instead a single inspection be made conjointly by national and State officers at Marcus Hook. The State Quarantine Board of Pennsylvania agreed to this after obtaining the consent of the governor, and permission was granted to service officers to board vessels from the State quarantine boat. Under this arrangement 352 steamers and 15 sailing vessels were inspected and passed at Marcus Hook from March 16, 1913, to July 1, 1913; 43,474 persons were inspected, of whom 17,500 were crews of steamers, 146 crews of sailing vessels, and 25,828 passengers on steamers. Three thousand six hundred and fifty-nine passengers were vaccinated. No quarantinable diseases were detected, and no vessels were detained for any cause other than to fumigate them for the destruction of rats. This fumigation was done after the arrival of the vessels at Philadelphia. The total number of vessels fumigated was 194—steamers 169, sailing vessels 25. This number includes all vessels that were fumigated on the Delaware River during the fiscal year except those fumigated at Reedy Island before the double inspection service was discontinued. Sulphur was used to fumigate 102 of these vessels, and the others were disinfected by flue gas pumped into their compartments by the Harker fumigating apparatus on the steamer *Bratton.*

Perth Amboy (N. J.) quarantine.—Acting Asst. Surg. Charles W. Naulty, jr., in charge.

Transactions.

Steamers inspected and passed	115
Steamers spoken and passed	8
Sailing vessels inspected and passed	2
Sailing vessels spoken and passed	1
Total number of vessels	126
Crews:	
Steamers	3,212
Sailing vessels	15
Total crews	3,227

Passenger	0
Stowaways	6
Steamers fumigated for destruction of rats	63
Sailing vessels fumigated for destruction of rats	1
Total fumigated	64
Steamers presenting certificates of prior fumigation	12

Delaware Breakwater quarantine.—Post-office and telegraphic address, Lewes, Del. Acting Asst. Surg. George G. Hart in charge.

Seven steamers and 6 sailing vessels were inspected and passed. Six hundred and eighty-five passengers and 497 crew were inspected. Suspected of smallpox infection from the previous voyage, the steamer *Haverford*, from Liverpool, was boarded and inspected at the breakwater on July 8, 1912. The crew and cabin passengers were vaccinated, the steerage passengers taken to the quarantine station, and the steerage compartments and hospital of the vessel fumigated with the formalin-permanganate method. Vessel was released. The steerage passengers ashore were bathed, and their body clothing disinfected. Their baggage was also disinfected. All passengers and employees of station were vaccinated. These steerage passengers (485) with part of crew (16) were detained in quarantine at the station until July 23, 1912, and then released. No cases of smallpox developed.

Cape Charles quarantine.—Acting Asst. Surg. W. B. McCaffry in charge.

Transactions.

Treatment.	Vessels.		
	Steam.	Sailing.	Total.
Granted pratique	620	14	634
Of which there were granted pratique after—			
Inspection	609	14	623
Fumigation at this station	58	4	62
Fumigation at ports of call or departure	160	0	160
Passed upon certificate of their medical officers	11	0	11
Held for observation after recent exposure to quarantinable disease	0	1	1
Held for diagnosis of cases	2	0	2

Crew inspected	40,603
Steerage passengers inspected	1,472
Cabin passengers inspected	502

The American schooner *Jane Palmer* from Portland, Me., for Newport News, Va., arrived on June 3, and was detained in quarantine until June 8, to complete 14 days from the date of her last exposure to smallpox. According to bureau telegraphic advice, one member of the crew had been removed from the ship and placed in a smallpox hospital at Portland prior to the departure of the ship from Portland. The vessel was fumigated throughout with sulphur dioxide 4 per cent for 12 hours, and all bedding and clothing was fumigated with formaldehyde gas for 12 hours. All members of the crew and the officers were vaccinated. No cases of smallpox developed.

The British steamship *Berwindmoor* from Habana for Newport News, fumigated in Habana July 9, arrived on July 12 and was detained in quarantine until July 16, pending diagnosis of a glandular swelling which proved to be parotitis.

The British steamship *Maudby*, from Messina and Gibraltar, arrived on October 31, 1912, with 1 case of cramps, vomiting, and diarrhea. A bacteriological examination was made of the stool of the suspect. Findings were negative, the patient recovered, and the vessel was released after 48 hours' detention.

Microscopical examinations of the blood were made in 8 cases of estivo-autumnal malaria in order to confirm a doubtful diagnosis of malaria, and the vessels were detained but a few hours.

In the course of the 62 fumigations carried out at this station 693 rats were killed and autopsied and found normal.

During the year glandular examinations were made of the crews of 43 vessels arriving from infected plague ports, and temperatures were taken of the crews of 105 vessels arriving from tropical ports.

Reedy Island quarantine.—This station has been brought to a satisfactory state of repair and preparedness. The detention capacity is 650 persons. The station steamer *Neptune* has been overhauled and equipped with the latest model of funnel gas fumigating apparatus.

Washington (*N. C.*) *quarantine.*—Acting Asst. Surg. J. C. Rodman in charge. There were no transactions during the year.

Cape Fear quarantine.—Post-office and telegraphic address, Southport, N. C. Passed Asst. Surg. M. C. Guthrie in charge.

Sixty-seven vessels arrived at quarantine during the year from the following places: Domestic ports 3, West Indies 3, South America 12, and Europe 49.

Nine steamers and 2 sailing vessels were fumigated. Fifty-four steamers and 2 sailing vessels were inspected and passed. The total number of crews and passengers examined was 1,704.

The 2 sailing vessels fumigated were from Callao, Peru, via Antofogasta, Chile. The steamers fumigated were from the following ports: Two from Hamburg via St. Michaels, 2 from Villa Real via Funchal, 1 from Teneriffe via Canary Islands, 1 from Antofogasta via Montevideo and Rio de Janeiro, 3 from Iquique via Antofogasta and Rio de Janeiro.

The trade in fertilizer material at this port is increasing each year, and as the ports from which these cargoes arrive are nearly all plague infected great precautions must be taken in the treatment of these vessels. In addition to the inspection of vessel and crew at quarantine the vessels are under the supervision of the medical officer in charge of the service at Wilmington, N. C., while unloading. Regulations as to rat guards, watching the gangways, etc., are rigidly enforced, and should there be signs of rats on board during discharge of cargo the vessel will be required to undergo a second disinfection before being allowed to clear for an American port.

Georgetown (*S. C.*) *quarantine.*—Acting Asst. Surg. M. P. Moorer in charge. No transactions.

Charleston (*S. C.*) *quarantine.*—Passed Asst. Surg. R. L. Wilson in command.

Steamers inspected and passed	130
Sailing vessels	9
Total crew on vessels	3,770
Total passengers on vessels	44
Vessels fumigated to kill rats	7
Dead rats found after fumigation	32
Rats of the above plague positive	0

Beaufort (S. C.) quarantine.—Acting Asst. Surg. Christopher G. Hay in charge. No transactions.

Port Royal (S. C.) quarantine.—Acting Asst. Surg. William P. Gibbs in charge. No vessels were inspected during the year.

Savannah (Ga.) quarantine.—Acting Asst. Surg. William J. Linley in charge.

One hundred and thirty-six vessels arrived during the year. Eighty-three steamships and 1 sailing vessel were inspected and passed; 2 steamships, coastwise, deck houses fumigated at St. Lucia, were inspected and passed; 1 steamship, fumigated throughout at St. Lucia, inspected and passed; 1 steamship, fumigated throughout at Colon, inspected and passed; 2 sailing vessels, fumigated throughout at Habana, inspected and passed. Seven steamships were spoken and passed. Twenty-three steamships and 6 sailing vessels were fumigated and released; 1 steamship fumigated and held for observation; 1 steamship, 2 cases of smallpox removed to station, disinfected, and held for observation; 1 steamship, loaded with nitrates, deck houses fumigated at St. Lucia, granted provisional pratique, and subsequently fumigated throughout at New York; 6 steamships, loaded with nitrates, deck houses fumigated at St. Lucia, granted provisional pratique, and fumigated throughout on completion of discharge of cargo; 1 sailing vessel, loaded with dried blood, deck houses fumigated, granted provisional pratique, and fumigated throughout on completion of discharge of cargo. Crews inspected, 3,625; passengers, 22. One death occurred on the station during the year, in the person of a Chinaman, suffering from pneumonia, removed from the steamship *Strathallan*.

Brunswick (Ga.) quarantine.—Acting Asst. Surg. J. A. Moncure in charge.

Thirty-eight vessels were spoken and passed, 21 steamers and 5 sailing vessels inspected and passed, 7 steamers and 9 sailing vessels disinfected.

One thousand seven hundred and forty-three crew on steamers, 139 crew on sailing vessels, 4 passengers on steamers, no passengers on sailing vessels.

No quarantinable disease was discovered during the year.

Tampa Bay (Fla.) quarantine.—Post-office address, Fort De Soto, Fla. Telegraphic address, via Palmetto, Fla. Acting Asst. Surg. S. G. Gill in charge.

Ninety-five steamers and 56 sailing vessels were inspected and passed, 18 steamers and 1 sailing vessel were inspected and held, 59 steamers and 26 sailing vessels were fumigated and passed, and 6 steamers were fumigated and held. Thirty-four passengers and 6,229 of crew were inspected.

On June 18, 1913, the station disinfecting wharf and superstructure, with contents, were destroyed by fire. The fire also destroyed all of the boats and the disinfecting machinery.

Cumberland Sound quarantine.—Post-office and telegraphic address, Fernandina, Fla. Acting Asst. Surg. J. Louis Horsey in charge.

Fifty-seven vessels were spoken and passed, 88 steamers were inspected and passed, and 11 sailing vessels were inspected and passed. On these vessels there were 3,754 passengers and crew. Eighteen steamers and 9 sailing vessels were fumigated.

St. Johns River quarantine.—Post-office and telegraphic address, Mayport, Fla. Acting Asst. Surg. Neil Alford in charge.

Fifty-five steamers and 31 sailing vessels were inspected and passed, 227 vessels were spoken and passed, and 11 vessels were fumigated.

Biscayne Bay quarantine.—Post-office and telegraphic address, Miami, Fla. Acting Asst. Surg. James M. Jackson, jr., in charge.

Two hundred and five vessels were spoken and passed, 7 steamers and 109 sailing vessels were inspected and passed. These vessels carried a total of 4,516 passengers and crew. Twenty-one sailing vessels were fumigated.

Key West (Fla.) quarantine.—Acting Asst. Surg. S. D. W. Light in charge.

During the year a total of 605 vessels were inspected, of which 517 were steam and 88 sailing vessels.

On account of the completion of the Florida East Coast Railway to Key West, the shipping from foreign countries has increased about 33⅓ per cent during the year, 153 vessels representing the actual increase.

A total of 51,995 persons were inspected, of which 29,997 were crews of steam vessels, 608 crews of sailing vessels, 21,218 passengers on steamers, and 172 passengers on sailing vessels.

A total of 5 steamers and 20 sailing vessels were fumigated during the year. No quarantinable diseases were encountered.

St. Andrews (Fla.) quarantine.—Acting Asst. Surg. Allen H. Miller in charge.

Two steamers and 28 sailing vessels were inspected and 5 vessels fumigated.

St. Josephs (Fla.) quarantine.—Acting Asst. Surg. B. S. Stutts in charge.

Fifteen steamers and 9 sailing vessels were inspected during the year.

Boca Grande quarantine.—Post-office and telegraphic address, South Boca Grande, Fla. Acting Asst. Surg. G. E. Atwood in charge.

Transactions at the Boca Grande quarantine station for the fiscal year ending June 30, 1913.

	Number.
Vessels entering quarantine	90
Vessels spoken and passed	63
Vessels inspected and passed	22
Vessels fumigated	3
Vessels held for completion of quarantine	2
Total number of crew inspected	822
Total number of passengers inspected	10
Total number of persons temperature were taken	90

No quarantinable disease was encountered during the year.

Of the 3 ships fumigated during the year, a very few rats were found, although the vessels were carefully searched for them. In one instance live rats being found after fumigation the vessel was immediately fumigated again and several dead rats were found. The majority of vessels arriving at this port are regularly employed in the phosphate trade, which accounts for the scarcity of rodents on them.

Pensacola (Fla.) quarantine.—Acting Asst. Surg. W. Barnes in charge.

Transactions.

	Number.
Total vessels entering quarantine	232
Steamers inspected and passed	72
Sail vessels inspected and passed	55
Vessels fumigated	103
Vessels held to complete quarantine	5
Crew inspected	4,702
Passengers inspected	3
Number of crew examined for glandular enlargements	2,524
Sick treated in hospital	1

These vessels were from the following countries: West Indies, 37 per cent; European ports, 23 per cent; South America, 17 per cent; Africa, 4 per cent; Canary Islands, 7 per cent; Mexico, 2 per cent. The remaining 10 per cent were about equally divided between Central America, Madeira, Cape de Verde Islands, Trinidad, St. Thomas, Greece, Bermuda, and St. Lucia. Fourteen per cent were in cargo, and the balance either in ballast or empty. A total of 412 rats were killed as result of fumigation, the highest number for any one ship being 109.

No quarantinable disease was found during the year.

The British steamship *Meadowfield,* from Manaos, via Para, Castries, and Belize, arrived on August 10, 1912, with a cargo of mahogany from Belize. As a result of careful examination of crew, one man was found to have an enlarged submaxillary gland and an occipital gland slightly enlarged. Vessel was held in quarantine until specimen from center of gland could be obtained and examined microscopically at the State board of health laboratory at Pensacola. Result, negative. Vessel was given provisional pratique and allowed to unload cargo, using rat guards on all lines and being fended 6 feet from dock, returning to quarantine immediately afterwards for thorough fumigation.

St. George Sound quarantine.—Post-office and telegraphic address, Carrabelle, Fla. Acting Asst. Surg. B. B. Blount in charge.

Thirty-six vessels were inspected and passed and 25 vessels were fumigated.

Port Inglis (*Fla.*) *quarantine.*—Acting Asst. Surg. B. W. Burland in charge.

During the year 9 steamers and 1 sailing vessel were spoken and passed; 30 steamers were inspected and passed. The steamers inspected carried 965 passengers and crew. Fourteen vessels were fumigated, yielding 469 rats.

Mobile (*Ala.*) *quarantine.*—Surg. John S. Boggess in charge.

The following is a summary of the vessels entering Mobile quarantine during the year, with the persons on board and their disposal:

	Number.
Steamers inspected and passed	418
Sailing vessels inspected and passed	176
Steamers detained to complete quarantine supervision	10
Steamers detained for observation	1
Steamers fumigated for destruction of rats	44
Sailing vessels fumigated for destruction of rats	93
Sailing vessels fumigated for destruction of mosquitoes	2
Officers and crews inspected and passed	13,017
Passengers inspected and passed	515

In 21 of the 44 steamers fumigated for destruction of rats, 173 rats were found after fumigation, as follows:

Hold	116	Pantry	2
Deck	18	Cabin	7
Storerooms	28	Lifeboats	2

In 33 of the 93 sailing vessels fumigated for destruction of rats, 102 rats were found after fumigation as follows:

Hold	57
Storerooms	24
Cabin	21

Pascagoula (Miss.) quarantine.—Acting Asst. Surg. B. F. Duke in charge.

	Nnmber.
Vessels inspected and passed	37
Vessels fumigated	36
Vessels fumigated at port of departure	26
Vessels spoken and passed	13
Officers and crew	957
Passengers	25

No quarantinable disease appeared.

Gulf quarantine station.—Post-office and telegraphic address, Biloxi, Miss. Passed Asst. Surg. E. A. Sweet in charge.

	Number.
Vessels entering quarantine	220
Inspected and passed	89
Spoken and passed	8
Fumigated and passed	117
Fumigated and held	5
Inspected and held to complete 6 days	1
Crew inspected	2, 911
Passengers inspected	28

The number of vessels entering quarantine has been practically the same as in the previous year, but owing to outbreaks of plague in various parts from which these vessels arrive, the amount of fumigating required has been over three times what has been ordinarily necessary. During the year no case of quarantinable disease was met with and the routine work calls for no mention except as follows: On March 15, the British steamship *Jeanara* arrived in quarantine from Porto Velho, Brazil, 2,000 miles up the Amazon, via Para. Eight men had been seriously ill during the voyage. All proved to be positive cases of malaria and the steamer was held only long enough to complete fumigation.

New Orleans quarantine.—Post-office address, Quarantine, La.; telegraphic address, via New Orleans, La. Passed Asst. Surg. G. M. Corput in charge.

Summary of transactions.

	Number.	Tonnage.	Crew.	Passengers.
Steamers inspected and passed	1,043	3,008,812	41,673	11,867
Steamers fumigated and passed	148	603,580	5,447	177
Steamers detained to complete 6 days	68	224,029	2,242	187
Steamers detained 6 days	5	10,365	131	
Steamers, crew detained at quarantine 6 days	2	1,811	37	
Steamers detained for diagnosis	2	7,111	58	
Sailing vessels inspected and passed	19	16,671	286	
Sailing vessels fumigated and passed	8	6,614	94	
Sailing vessels detained 6 days	4	2,156	42	
Total (exclusive of vessels spoken and passed)	1,299	3,881,149	50,010	12,231
Vessels spoken and passed	186			
Total vessels at quarantine	1,485			
Ships on which temperatures were taken	597		21,988	6,581

Total number temperatures taken during year	28,569
Total ships fumigated:	
Number	187
Tonnage	684,197
Ships with quarantinable disease (with case yellow fever)	1
Sick in hospital	10
Sick with quarantinable disease (yellow fever)	1
Deaths in hospital (malaria fever)	1

The New Orleans quarantine station is located on the east bank of the Mississippi River, 91 miles below New Orleans. It was established at its present site by the State of Louisiana in April, 1888, and was known as the Mississippi River quarantine station. In 1906 negotiations for its transfer to the United States Public Health and Marine-Hospital Service were begun. The station was formally taken over by purchase in April, 1907, but title to the reservation was not definitely settled until 1910.

Since the taking over of the station by the United States Public Health and Marine-Hospital Service (now United States Public Health Service), many improvements have been made and the station put on a high plane of efficiency. While much remains to be done towards its perfection, and while it is still much handicapped by having a considerable amount of old and badly worn machinery, the fact remains that it is one of the best equipped stations in the world.

By reason of the magnitude of shipping into the port of New Orleans, and its dangerous proximity to infectible and infected territory, and the fact that New Orleans is easily infectible, the New Orleans quarantine station stands out as one of the most important quarantine stations in the world, and makes it one where unceasing vigilance is paramount to every other consideration, and its methods of inspection, therefore, differ somewhat from ordinary quarantine practice.

Two medical officers board every vessel, and when passengers and crews are mustered on deck of vessel, both officers make careful inspection of every person on board. From April 1 to November 1 the temperatures of all persons on board vessels coming from southern latitudes are taken. A careful record is kept of all persons passing through quarantine. This includes crew and passenger lists and notes of any unusual conditions.

The importance of taking all temperatures on ships is aptly illustrated by the fact that 1 case of yellow fever was picked up on October 6, 1912, which would undoubtedly have passed any other method of inspection, as there was nothing in the man's personal appearance to suggest disease other than a slightly flushed face, which was easily accounted for by his occupation. Thermometer indicated a rise in temperature, and a 12-hour observation demonstrated a typical case of yellow fever.

During the fiscal year just ended numerous improvements have been made on the station. One new set of officers' quarters has been built and a very efficient launch purchased.

San Diego (*Cal.*) *quarantine.*—Acting Asst. Surg. W. W. McKay in charge.

Three hundred and seventy-eight vessels were inspected and passed. Four vessels were fumigated. These vessels carried crews aggregating 6,662 and 3,180 passengers.

Port Harford, Cal.—Acting Asst. Surg. C. J. McGovern reports as follows: Fifty-nine steamers, carrying 2,197 crew, were inspected during the fiscal year. No quarantinable diseases were observed.

San Francisco (*Cal.*) *quarantine.*—Passed Asst. Surg. M. W. Glover in charge.

During the fiscal year 576 vessels were handled at quarantine, and 74,584 persons inspected, of which 40,585 were crew men and 33,999 passengers.

Summarized, the transactions were as follows:

Steam vessels inspected and passed	439
Sailing vessels inspected and passed	110
Steam vessels boarded and passed	20
Steam vessels spoken and passed	5
Steam vessels inspected and held	2
Steam vessels fumigated (smallpox)	2
Steam vessels fumigated (leprosy)	1
Steam vessels fumigated (rodents)	184
Sailing vessels fumigated (rodents)	31
Passengers bathed and effects disinfected	124
Crew bathed and effects disinfected	261

Vessels held for violation of consular surgeon's requirements.—The British steamship *Bessie Dollar*, tonnage 3,679, arrived on November 18, 1912, with a general cargo from Shanghai. Owing to the failure of the master to comply with the requirements of the service representative at Shanghai, the vessel was placed in quarantine and fumigated with sulphur dioxide for 24 hours, the crew taken ashore, bathed, vaccinated, and effects disinfected.

Vessels with quarantinable disease aboard.—The Pacific Mail steamship *Nile*, plying between the Orient and San Francisco, arrived on November 11, 1912, with a case of smallpox in the person of a Chinese child 4 years old. The vessel was placed in quarantine at the station. The passengers and crew were removed to the station, bathed, vaccinated, and all of their effects disinfected with formaldehyde. The entire vessel, with the exception of the captain's quarters (which were treated with formaldehyde) was fumigated with sulphur dioxide, 24 hours' exposure.

The passengers were released on November 12, the crew on November 14, and the patient on November 30, recovered.

The Pacific Mail steamship *Manchuria* arrived at this port on June 16, 1913, from the Orient. During the usual quarantine inspection it was discovered that one of the steerage passengers, a Spaniard, 22 years old, was afflicted with tubercular leprosy. The diagnosis was confirmed by microscopical examination. Prior to coming to San Francisco the patient had worked on a sugar plantation near Hilo, Hawaii, for nearly two years. The man was removed from the vessel and detained at the quarantine station for 10 days, at the expiration of which time he was returned to Honolulu by the same vessel which brought him to San Francisco.

The steerage quarters in which the man had lived during the voyage from Honolulu were fumigated with sulphur dioxide.

Smallpox being more or less prevalent in the region of San Francisco Bay the crews of vessels going to Alaska were inspected and vaccinated for the protection of that district.

In addition to the quarantine work the boarding officers examined the crew and passengers on the smaller steamers and sailing vessels for diseases and conditions forbidden by the immigration law.

Two fumigations of quarters on vessel for tuberculosis were done at the request of the vessels concerned. This was in response to a recommendation of the medical officer in charge of the San Francisco Marine Hospital.

Eureka, Cal.—Acting Asst. Surg. Charles C. Falk reports that during the year 6 steamers and 5 sailing vessels were inspected and passed, and one steamer fumigated.

Fort Bragg, Cal.—Acting Asst. Surg. G. P. Purlenky in charge. Two vessels were inspected and passed.

Los Angeles (Cal.) quarantine station and subports.—Surg. S. D. Brooks in charge. This station includes three ports for quarantine inspection of vessels—San Pedro, Redondo, and Santa Barbara (including Gaviota).

Transactions.

	Steamers inspected.	Sailing vessels inspected.	Total vessels inspected.	Vessels fumigated.	Total passengers and crews inspected.
San Pedro	81	4	85	6	4,027
Santa Barbara	1	10	11	0	213

No quarantinable disease was found during the year.

Port Townsend (Wash.) quarantine and subports.—Passed Asst. Surg. Baylis H. Earle in charge.

Two steamers were spoken and passed, 164 steamers were inspected and passed and 20 detained, and 60 sailing vessels were inspected and passed and 23 detained. The steamers carried a total of 15,000 members of crews and 13,406 passengers, and the sailing vessels a total of 1,173 members of crews and 44 passengers. Of the vessels detained, 19 steamers, 13 schooners, and 10 barks were fumigated for the destruction of rats and other vermin, and the U. S. S. *Snohomish* was fumigated for measles and held under observation for four days.

Coos Bay (Wash.) subport, North Bend.—Acting Asst. Surg. I. B. Bartle reports 5 vessels inspected and passed.

South Bend (Wash.) subport.—Acting Asst. Surg. Wilson Gruwell reports 10 sailing vessels inspected and passed.

Port Angeles (Wash.) subport.—Acting Asst. Surg. F. S. Lewis reports that 1 sailing vessel was inspected and passed.

Tacoma, Wash.—Acting Asst. Surg. F. J. Schug reports that 10 vessels from the west coast of South America were fumigated during the year.

Columbia River (Oreg.) quarantine and subports.—Post-office and telegraphic address, Astoria, Oreg. Passed Asst. Surg. H. G. Ebert in command.

During the year 63 steamers and 92 sailing vessels were inspected and passed, 64 vessels were fumigated, 4,668 crew and 325 passengers were inspected.

Ketchikan, Alaska.—Acting Asst. Surg. Henry C. Story reports as follows: 66 vessels were inspected and passed, together with 7,107 passengers and crew.

TEXAS-MEXICAN BORDER INSPECTION.

El Paso, Tex.—Acting Asst. J. W. Tappan reports that during the year 10,000 passengers arriving on trains were inspected, and in addition 8,365 aliens were examined at the immigration station.

Brownsville, Tex.—Acting Asst. Surg. G. D. Fairbanks reports as follows:

Train service across the international bridge was started March 22 and continued intermittently until May 9, when it stopped on account of the revolution. Thirty-six trains were inspected during that period, carrying 1,477 passengers, also freight trains are inspected several times a month to determine the character of merchandise being brought into the port and its sanitary condition.

Four thousand one hundred and thirteen aliens were examined for the immigration authorities, and 7 physical examinations made for the United States Life-Saving Service. Four examinations of stools made for uncinaria with negative results and superficial inquiry as to the number of lepers in the vicinity disclosed six supposed cases on the United States side and probably more on the other side of the boundary.

Eagle Pass, Tex.—Acting Asst. Surg. Lea Hume reports that during the year ended June 30, 1913, there were inspected on trains and at the immigration station 19,971 persons arriving from Mexico, of which number 13,777 were immigrants.

Owing to the disturbed conditions in Mexico, no trains came to the American side of the Rio Grande after February 28, 1913. After March 9, 1913, trains were run between Monclova, Coahuila, Mexico, and Piedras Negras, Coahuila, Mexico, only, on the Mexican International Railroad. No quarantinable diseases arrived on the trains.

During the months of December and January of the past fiscal year cerebrospinal meningitis was present in Eagle Pass and Piedras Negras, Mexico, in epidemic form, there being 15 cases in Eagle Pass and 11 deaths.

Laredo, Tex.—Acting Asst. Surg. H. J. Hamilton reports that during the fiscal year 481 passenger trains entering from Mexico were inspected. These trains carried a total of 48,683 persons, as compared with 1912, when 735 passenger trains were inspected, carrying 44,344 passengers. No passenger trains have crossed the border at Laredo since March 12, 1913.

INSULAR QUARANTINE.

OPERATIONS OF THE SERVICE IN THE PHILIPPINE ISLANDS.

The work of the United States Public Health Service in the Philippines divides itself readily into the conduct of:

(1) National quarantine.
(2) Consular quarantine.
(3) Immigrant medical inspection.
(4) Physical examination of masters, mates, and engineers in the Philippine coastwise trade.
(5) The sanitary maintenance of vessels.

There are seven ports of entry in the Philippine Islands, the quarantine work at each of which is conducted by an officer of the service. In addition, there is maintained a large quarantine station at Mariveles, at the entrance of Manila Bay and approximately 30 miles west of Manila, which is also in command of a service officer. In connection with the station at Cebu there is operated a modernly equipped quarantine station, which serves the needs of the southern islands.

Vessels bound for the United States fall under the head of consular quarantine and receive the same inspection and application of sanitary measures as those which depart from foreign ports at which service officers are stationed.

The conduct of the medical examination of arriving aliens is likewise vested in the service.

The physical examinations made of masters, mates, engineers, pilots, etc., imposes a large amount of work upon the officers. During the year 283 examinations were made.

The sanitation of ships refers to sanitation other than that necessitated by the presence of quarantinable diseases, and is the direct outcome of the agitation for this line of work which has been waged by the service for many years, with the result that recently there have been promulgated regulations based on the customs laws of the islands, which make it possible materially to improve the cleanliness of the ships and the comfort of the traveling public.

The Mariveles quarantine station is one of the largest in the world, and the magnitude of its operations is comparable with those of the largest ports of Europe or America.

PRINCIPAL EVENTS OF THE YEAR.

The responsibility of preventing the introduction of both plague and cholera during the year has been very heavy, because plague prevailed in epidemic form in near-by foreign ports, and epidemics of cholera occurred both in China and Japan at ports which are within five days' steaming distance of the Philippines and, therefore, well within the incubation period of this disease. Experience had with plague, both in Manila and in preventing its introduction, clearly points to the fact that the present methods of quarantine will require further perfection before the introduction of plague can be prevented with more certainty. The inspection of thousands of tons of cargo showed that much of it consisted of goods packed in straw, of eggs, dried vegetables like garlic, onions, potatoes, etc. Much of this cargo is poorly crated and some of it is only covered with burlap, so that there is ample opportunity for rats to enter the cargo at the port of embarkation and to remain there undisturbed until it is delivered in the warehouses in the ports of the Philippines. Another important development has been that of ship sanitation, of which mention will be made under a separate head.

Probably one of the most satisfactory events of the year was that, in spite of the serious epidemic of cholera prevailing both in China and Japan, no quarantine detention was imposed upon arrivals from those countries. Complete reliance was placed upon the medical inspection made at the time of arrival and the laboratory examinations of the stools. As soon as these were reported negative, detained persons were released, usually within 48 hours from the time of their arrival. This procedure greatly facilitated the work of the service and reduced the hardships upon those who were required to travel, as well as greatly decreased the expense of the transportation companies, and at the same time was effective.

CHOLERA.

For the first time in many years not a single case of cholera was reported anywhere in the Philippine Islands, which fact made it all the more important for the service to prevent the introduction of this disease from foreign countries. The Philippines were seriously threatened by the outbreak of cholera, which was first reported in Shanghai and later spread to the Chinese ports to the south of Shanghai and to the Japanese ports to the north of it, especially those in the Shimonoseki Straits. Many coaling vessels arrived from ports along the Shimonoseki Straits, and as most of their crews are peculiarly liable to cholera, special attention was given the personnel of vessels from those ports. In several instances persons with a form of diarrhea which might be described as cholerine were encountered, but as no vibrios could be found in the stools, the diagnosis of cholera could not be made. Such persons, however, were detained aboard the vessels during their stay in port.

In the conduct of the cholera quarantine no detention was imposed except that necessary to make the routine laboratory examination of the stools for the cholera vibrio.

The stool examinations were continued throughout the entire fiscal year of all steerage passengers from infected ports. During the quarantine period from July to November, 1912, the work was done at the Mariveles quarantine station by a special detail of officers from the bureau of science. After the close of the quarantine the work was done at Manila.

The last true cholera vibrio carrier was found June 30, 1912. Three persons showing vibrios were found between November, 1912, and June 30, 1913, but were, after extensive investigation, declared not to have the true vibrio of Koch.

In addition to the examination made for the cholera vibrios, examinations were made for hookworm and other intestinal parasites with the following results:

Specimens examined for cholera	6,997
Cholera vibrios found in	0
Hookworm found in	375
Ascaris found in	1,777
Trichiuris found in	931

HOOKWORM AND OTHER INTESTINAL PARASITES.

The routine examination made of persons arriving from foreign ports, the majority of which were from China, gave an excellent opportunity of learning the percentage of hookworm and other intestinal parasite infection among arrivals.

In all there were 5,259 specimens examined. Of this number, 375 contained hookworm, or a percentage of 7.1; 1,777 contained ascaris, or a percentage of 33.8; 931 contained trichiuris, or a percentage of 17.7.

It was very rare to find a specimen that contained only one kind of intestinal parasite.

LEPROSY.

Twelve vessels were disinfected, either wholly or in part, during the year on account of having had lepers on board. Disinfection and fumigation of the vessels of the insular government which are used in conveying lepers to the Culion leper colony has been done as heretofore at the Mariveles quarantine station. In carrying out this work the fact was in constant evidence that the present methods do not insure the killing of all vermin, as, for instance, the destruction of small ants and other insects that secrete themselves in the woodwork, crevices, and cracks of a ship.

Considerable interest was also aroused during the year by the reported cure of two lepers at the San Lazaro Leper Hospital in Manila by the use of chaulmoogra oil, resorcin, and camphoric acid administered in hypodermic form. The details of these cases have already been published in the Public Health Reports.

MEASLES.

The outbreak of measles, of which mention was made in the last annual report, particularly of the fact that it was probably introduced from the outside and from foreign countries, continued to spread throughout the Philippine Islands and throughout the year 22 deaths were reported from measles. A number of conferences were held with the officials of the United States Army with the view of adopting measures which would prevent the introduction of measles by Army transports from the United States. These resulted in the following set of regulations being adopted:

(1) The military authorities continue to exercise all the care heretofore exercised to prevent the spread of the disease.

(2) That in the fullness of precaution, each infected man's locker and his clothing in use be disinfected on the transport as soon as the diagnosis is made.

(3) That all personnel infected be sent to hospitals and suspects be kept under observation of medical officers, in hospitals if necessary, if belonging or attached to the military service, while civilians infected or exposed be notified to the bureau of health and placed under its control.

The modern views with regard to the period of infectivity of measles, as shown by the work of Anderson and Goldberger, are being given a practical test in dealing with measles cases in Manila. In a girls' dormitory in which there were quartered 20 girls, none of whom had had a previous attack of measles, there appeared a typical case in a girl who had been outside the dormitory for a number of weeks and who returned to the dormitory three days after the rash had made its appearance. For a period of 36 hours she came into intimate contact with the remaining girls, but as she was considered to be no longer infective she was simply transferred to an isolation hospital and none of the contacts were quarantined. They were permitted to attend school with several hundred other girls, many of whom had not had the disease. Disinfection of the premises was carried out. No further cases occurred.

PLAGUE.

Plague has continued to occur in the Philippine Islands at intervals since the first case was discovered on June 17, 1912. During the fiscal year there was a total of 74 cases and 63 deaths. Of these, 65 occurred in Manila, with 54 deaths; and 9 with 9 deaths at Iloilo.

Iloilo.—Surg. Fox, who was at that time acting as assistant director of health, was placed in charge of the plague eradication measures in Iloilo and his efforts were completely successful. A case suspicious of plague was reported on July 5, and this diagnosis was subsequently confirmed. The victim, a Chinaman, was reported to have come from Bais, Oriental Negros, but later investigation showed that he had been a resident of Iloilo at least since February, 1912. The next case was reported the 18th of August. There were then 6 more cases at short intervals, the last case of the outbreak occurring September 17, 1912. In spite of the very extensive rat catching which was done over a period of five months no plague infected rats were found in Iloilo. All of the cases occurred in two houses, and there is considerable evidence to support the belief that the plague in Iloilo may have been introduced by bedbugs. In Iloilo, as in Manila, the disease did not have its beginning along the water front, nor among persons who had been away from the city or who were likely to come in contact with persons who come on foreign ships. On account of the fact that foreign vessels anchor alongside the wharves in Iloilo River, and since large quantities of food supplies are imported on such vessels, it is possible that the infection may have been imported direct from China or Japan. Careful outgoing quarantine measures were carried out at Iloilo with the view of preventing the spread of the disease from that port to other places in the islands.

Rat plague in Manila.—Immediately after the first case of plague was discovered in human beings, on June 17, 1912, an active rat-catching campaign was begun, all efforts being concentrated to the vicinity in which human cases had occurred. Rats were caught at the rate of approximately 3,000 per month, but it was not until August 31 that a plague rat was found. This was caught in a spring trap at 351 Calle San Sebastian, which is in the same block in which human cases had previously occurred and far removed from the water front. On September 7 two additional plague rats were found in blocks surrounding the one mentioned above. During October plague rats were found in sections of the city far removed from those in which they were discovered at first. The percentage of plague among rats up to this time was 0.005, which is unusually low. In Hongkong, for instance, 7 per cent of the rats examined have proved to be plague infected. During March and April the infection among rats rose to 0.268 in the Tondo district. The average for the year in Manila was 0.0645 for the 54,183 rats which were caught. It may be of interest to report that, with only a few exceptions, no dead plague rats were found, all of those detected having been either poisoned or caught in a trap. During the past few months both human and rat plague has been confined to the Tondo district, which is the most insanitary in Manila and is built up almost entirely with houses of bamboo, covered with the nipa palm. No plague rats have been found along the water front at any time.

Explosive outbreak.—Between the dates of October 20 and 22, 1912, 13 cases of plague were reported in Manila. On investigation it was found that, while they occurred in widely separated sections of the city, they were all among laborers who were employed in the Manila & Dagupan Railway station, where plague among rats was afterwards shown to exist. Subsequently a total of 17 cases was traced to this source. Upon active measures being taken to eradicate the rats from these warehouses no further cases of plague originated there.

Methods used in combating rat plague.—In addition to the well-recognized measures for combating plague, special stress was laid upon intensive efforts in sections in which plague rats had been discovered. Upon the finding of a plague rat a large force of cleaners immediately began at the outskirts of an imaginary circle drawn from the point at which the plague rat was found, which was large enough to include a number of blocks on all sides. A gang of men then began on all sides of the circle and systematically worked toward the center, destroying the rats as they went and following this up with rat-proofing measures. In view of the experiences, however, of the Dutch in Java with the nesting of rats in hollow bamboo, especial attention was given to the destruction of rats' nests in bamboo and elsewhere. By constantly changing the nests of the rats there was less danger of their leaving plague-infected fleas behind to be transmitted to other rats which subsequently occupied the nests. The bamboo work in many of the houses and in fence construction was carefully examined and in some sections of the city this was rewarded with the finding of dead plague rats, thus confirming the experience of the Dutch as to the importance of eliminating bamboo as a harboring place for rats. Infected places were treated with petroleum and then disinfected with a soapy coal-tar preparation like larvacide. The ends of the bamboo were thoroughly cemented. Experience showed that a rat seldom gnawed through the side of a piece of bamboo.

Arsenic in the proportion of 1 to 5 boiled with rice proved by far to be the best rat poison; the rats did not seem to tire of it, or to grow suspicious of it.

Rat-proof construction.—The regulations based upon ordinances of the city of Manila now provide that—

> All proposed new buildings of whatever nature, whether factory, stable, garage, bodega warehouse, private dwelling, or any other class of building, shall be designed and erected, so as to have no hollow ceilings, walls, columns, stairs, floors, etc. This shall also apply to repairs or alterations to existing structures. Whenever a ceiling or hollow partition is removed the same shall not be replaced.

Architects, builders, and others concerned are requested to incorporate the following paragraph in plans and specifications for future buildings of this nature:

> For the purpose of preventing the entrance and harboring of rats, etc., this building will be constructed (repaired) without hollow walls, hollow ceilings, hollow stairs, hollow floors, hollow columns, etc.
>
> All walls, with the exception of solid wood framing, within 1 meter of the ground will be of concrete, brick, stone, mortar, or other material proof against the incursions

of rats, and will extend below the ground a depth of at least twice the thickness of the wall.

Factors concerned in the introduction of plague.—Immediately after plague made its appearance in Manila large numbers of rats were caught along the water front and along the wharves, but none of them were found to be plague infected. The first cases of human plague occurred in permanent residents who had not been out of Manila in many months and in persons who did not associate with people who worked along the water front or with persons who had recently been in a plague-infected country, from which fact it is inferred that the disease was not introduced by human beings. That infected rats gained access directly to wharves from ships is also unlikely, because the rats along the water front are free from plague, rat guards are used, the wharves themselves are rat proof, and gangways, cargo chutes, etc., are raised when not in actual use. Furthermore, vessels from plague-infected ports are fumigated with sulphur at least twice annually and ships carrying rice are fumigated upon every trip; beginning in April, 1912, after cases of human plague had been detected at quarantine upon arriving vessels, all ships that came from Hongkong and Amoy, which are the most likely places from which plague would come, to the Philippines, were fumigated on every other trip. From the foregoing it is evident that, reasoning by exclusion, infected rats were probably introduced in cargo.

The disease might have been introduced by the means of infected bedbugs. In a case of human plague which was found at No. 508 Calle Magdalena bedbugs were found in the mat upon which the man died, and smears made from the intestinal contents showed plague-like bacilli. The inoculation experiments, however, were not confirmatory. On account of the fact that second and third class passengers' clothing and effects, as well as those of the crew, are steamed at Mariveles, it does not seem likely that bedbugs could have readily been introduced. There was, however, plenty of opportunity for infected bedbugs to be transmitted from Manila to Iloilo, for instance.

SMALLPOX.

During the year smallpox was found on eight arriving vessels, but, owing to the thorough manner in which crews are continually vaccinated by this service, there is no opportunity for this disease to spread through the personnel of vessels. Smallpox on shore, owing to the very general vaccination conducted by the bureau of health, was also less this year than formerly. Instead of 40,000 or more deaths as heretofore, the total number was only a few hundred, and these occurred in sections in which persons had not been vaccinated.

A very mild disease occurring in Manila which has not caused a death for many years has been reported as varioloid, but from a number of inoculation experiments made by Maj. Ashburn, it appears that the disease is not varioloid, and that in all probability is a form of chickenpox. At all events, it is noteworthy that there has not been a death from smallpox in Manila since June, 1909.

TYPHOID FEVER.

Blood examinations made of cases of fever in widely separated sections of the Philippines shows that typhoid fever is present over a large area. Investigation shows, however, that it is not present in epidemic form, the spread of the infection being probably due to contact infection. With the exception of artesian wells and the systems in Manila and Cebu, there are no public water supplies, so that the opportunities for starting an epidemic do not exist to the same extent as in the United States.

SHIP SANITATION.

It is believed that the steps taken in the Philippines to secure clean ships and good food and safe water are somewhat in advance of the requirements of other countries, but their reasonableness can scarcely be questioned. The complete regulations for the sanitary maintenance of ships are published in a separate pamphlet, known as Customs Circular No. 53. Briefly they provide that a sanitary inspector shall carefully inspect all vessels in the ports of the Philippines and satisfy himself that the ships are mechanically clean in all parts, that there is adequte air space, ventilation, food and water supply, hospital accommodations, and other conveniences necessary for the health and comfort of passengers; the use of distilled or sterilized water is compulsory; samples are taken from time to time for laboratory examination; tanks are to be cleaned at regular intervals with live steam; galleys or places where food is prepared must be located as far as possible from water-closets; garbage chutes must be kept clean by daily washing with sand and water; the ice boxes of the vessel must be emptied and thoroughly cleansed with soap and hot water at least once a week, and at the end of each voyage they must be thoroughly washed with a solution of potassium permanganate. Vessels must also have a sufficient supply of linen tablecloths and napkins to insure that those in use shall be clean. Cooking and table utensils must be thoroughly washed with boiling water. Sheets, pillow-cases, towels, etc., must be kept clean. There must be water-closets for each class of passengers and for the crew. Proper ventilation is insisted upon, because one of the greatest evils in the Tropics are the ill-ventilated, foul-smelling toilets. For all vessels carrying passengers making a voyage of more than 36 hours adequate bathrooms must be provided, for the sanitary condition of which the officers are held responsible. Cooks, stewards, and other persons engaged in preparing and serving food must be free from dangerous communicable diseases.

LEGISLATION.

No legislation directly affecting the administration of the service and its general operations was enacted by the Philippine Legislature during 1913. The appropriation bill for the current expenses for the government of the Philippine Islands failed of passage. In the public works appropriation act two items were included for the benefit of the quarantine service. The first, the providing of the sum of $25,000, appropriated for the Bureau of Navigation, to meet part of the cost to replace the wooden wharf at the Mariveles quarantine station with a concrete structure. The second, an item of $12,500 for the purchase of a launch for use as a boarding boat at the port of Manila and supply vessel for the Mariveles quarantine station.

INSPECTION OF ARRIVING VESSELS.

The Philippines are so near to the world's great infected centers that only by the application of rigid quarantine requirements can the prevention of the introduction of quarantinable diseases be hoped for. Practically all vessels from the north and west arrive from the last port within the incubation period of all the quarantinable diseases, consequently the character of the work required of the quarantine service in the Philippine Islands to prevent the introduction of such diseases is of the highest. The Panama Canal will open a new avenue from the Orient to the eastern part of the United States, and also threaten the Philippines with yellow fever from America. Many vessels that visit the ports of both hemispheres make the Philippines a port of call. The United States quarantine laws and regulations by being enforced against such vessels are becoming a great world factor in improving the sanitary condition of even foreign vessels.

During the year 943 arriving vessels were inspected. At Manila there were 638, at Iloilo 74, at Cebu 166, at Cavite and Olongapo 6, at Zamboanga 21, and at Jolo 27. The procedure of requiring vessels from foreign ports which call at more than one Philippine port to await quarantine inspection only at the first port of call was continued during the year.

BILLS OF HEALTH.

The service in the Philippines comes in contact with bills of health for vessels both arriving and departing. Vessels leaving foreign ports for the Philippine Islands are required by law and regulations to obtain consular bills of health at foreign ports of departure. During the year the same, or even greater, defects have been encountered than heretofore in connection with bills of health presented by arriving vessels. Vessels leaving the eastern coast of the United States and proceeding via foreign ports scarcely ever arrive at Manila with bills of health in proper order. For instance, a vessel leaving New York for the Philippines should obtain its first original consular bill of health at the first foreign port of call, and at each subsequent port a supplemental consular bill of health. In practice, however, it is found that the first bill secured at a foreign port is often a supplemental one, which in effect is issued to supplement an original which does not exist. At a later port the vessel not being able to produce an original bill of health to which previous supplemental bills were issued as supplements, the consular officer finds himself compelled to provide the vessel with an original bill of health which can be supplemented by other consular officers at subseqeunt ports. This procedure of issuing a supplemental bill of health to a vessel which does not possess an original consular bill to supplement has become general, having occurred at nearly all of the southern Europe and east Africa ports. The only reason seems to be that the consular officers may be of the opinion that the customs bill of health issued at the port of departure in the United States can be deemed to have taken the place of an original consular bill of health to which a supplemental consular bill can be issued as a supplement; but this is not believed to be in accordance with the law, which states, section 2, that any vessel at any foreign port clearing for any port or place in the United States shall be required to obtain from the consular officer a bill of health. Again it has been decided that masters of vessels can not be required upon arrival in the Philippines to present a bill of health from a continental American port; which also shows that the customs bill of health can in no instance be construed as being a consular bill of health.

The recommendation that only one bill of health form, embodying the features of both original and supplemental, be prescribed is again made as the best solution of the bill of health problem. The schedule of fees now collected need not be disturbed by such an arrangement, because the first bill of health obtained would bear the $5 fee stamp for the original bill, and each subsequent bill of health obtained at an American consulate would bear the $2.50 stamp.

During the year, 943 bills of health were inspected on arriving vessels, and 1,239 bills of health were issued to departing vessels in the Philippine Islands.

VESSELS DISINFECTED.

During the year, 34 vessels were disinfected at the several stations of the service in the Philippine Islands, as follows: Smallpox infected vessels, 7; varioloid infected vessels, 3; measles infected vessels, 3; vessels having lepers as passengers, 6; vessels engaged in transporting lepers, 6; vessels disinfected on account of typhoid fever, 1; tuberculosis, 1; vessels from infected foreign ports disinfected, 5; vessels disinfected for other causes, 2. No secondary case of disease occurred among the personnel of a vessel after disinfection.

FUMIGATION OF VESSELS.

Chief reliance is still placed upon the fumigation of all vessels with sulphur at intervals of not less than six months to prevent the introduction of plague, and to prevent its spread if it should gain entrance. The vessels in the inter-island trade, as well as launches and lighters engaged in harbor and river work, were fumigated, which brings the grand total up to 951. At Manila there were 585 vessels fumigated as follows:

Large steamers	98
Small steamers	70
Sailing vessels	53
Seagoing lighters	86
Launches	84
Bay and river craft without power	150
Vessels from infected ports	44
Total	585

At Iloilo 294 vessels were fumigated, at Mariveles 5, and at Cebu 67. Such fumigation as was performed in connection with vessels having diseases on board are not included in the above, but are classed under disinfections. Considerable comment has been heard during the year as to the efficacy of this work on inter-island vessels, because it has promoted considerable travel comfort by ridding the vessels of bugs, mosquitoes, and roaches, as well as rats and mice. The steamship owners and masters have been most favorable to the carrying out of this work and have profited thereby, on account of the saving of the work and expense caused by the damage done by gnawing rats and mice as well as the large amount of cargo spoiled and food necessary for their maintenance.

MEDICAL INSPECTION OF IMMIGRANTS.

At the ports in the Philippines all arriving aliens are required to undergo the medical examination prescribed by the immigration laws. This work is done by the service officers detailed for quarantine duty and is performed by the officers in addition to their quarantine duties as heretofore, the examination of steerage passengers is made on board the vessels upon arrival immediately after conclusion of the quarantine inspection. Additional examinations are also made at the immigrant detention station and at the offices of the quarantine service. The performance of these functions requires much arduous and annoying work, especially as protests and appeals are quite frequent. Boards were convened during the year when necessary to decide appealed cases. There were 6,581 arriving aliens examined and 126 of these were certified as having defects which will affect their abilities to earn a living, or being afflicted with dangerous contagious diseases, principally trachoma and hookworm. At Manila there were 5,312 inspections, at Iloilo 439, at Cebu 114, at Zamboanga 390, and at Jolo 326.

VACCINATION.

Vaccination of incoming passengers was continued throughout the entire year, also all persons employed on inter-island vessels as members of the crew were required to present evidence at inspection of having been recently vaccinated by a representative of this service. The card system adopted in 1904 has been continued in use and is most satisfactory. The vaccination cards of the crew of every inter-island vessel are examined by a sanitary inspector once during each stay of the vessel in port, and at such inspection those who do not possess "successfully vaccinated" cards are revaccinated. New members of a crew who do not possess vaccination cards are required to be sent to the quarantine office to be vaccinated and obtain a service vaccination card before entering upon their duties on the vessel. For the above reason smallpox among the crews of inter-island vessels, which six years ago was very common, has now become a rare occurrence.

During the year there were vaccinated at Manila 906 crew and 2,516 cabin and 4,707 steerage passengers. At Mariveles 2,791 passengers were vaccinated. At Iloilo vaccinations of crews amounted to 432, at Cebu there were 396 vaccinations. In view of the fact that the entire population of the Philippine Islands has been systematically vaccinated a number of times, the percentage of takes has decreased greatly during the past few years. However, the vaccine used is very potent as evidenced by the large number of successful takes observed among the newly arrived passengers from other countries. No infected arms were encountered and no deleterious effects of the vaccination manifested themselves in a single case coming under the observation of the officers of this service.

The total number of vaccinations by the service in the Philippine Islands amounted to 11,736.

No vaccination certificates were issued to persons bound for the Panama Canal Zone, or the city of Colon or Panama.

RAT GUARDS FOR VESSELS.

The standard rat guard invented and put into use by the service in the Philippines, has been adopted by many foreign sanitary officials and it has been illustrated in a large number of periodicals published in various parts of the world. The presence of plague at foreign ports and the few cases in Manila and Iloilo made it advisable to require all vessels plying between Philippine ports, as well as those from foreign ports, to use rat guards. A circular letter was issued April 3, 1913, promulgating such requirements and providing that all vessels plying between Philippine ports, or from foreign ports, tying up at wharves, quays, or piers in the Philippine Islands should have all lines of the vessel to wharf or lighter provided with rat guards of an approved pattern, so placed as to prevent the rats on vessels from escaping therefrom, and rats from shore or lighter from gaining access to the vessel. The procedure was put in effect at every port in the Philippine Islands where there is a wharf or quay, and applied to every vessel coming alongside said wharf or quay.

Samples of approved rat guards were exhibited at the quarantine offices at the various ports of entry. Masters of vessels were requested immediately to provide themselves with a sufficient number of guards so that no line at any time need be in position without the necessary rat guard.

Failure to comply with the above requirements is punishable as a misdemeanor by a fine of not less than 10 nor more than 100 pesos for each offense. The penalty clause met with no opposition when put into effect, and resulted in a more wholesome respect for the regulations.

QUARANTINE AGAINST PLAGUE ON THE CHINA COAST.

The year under report opened with quarantine in force against arrivals from Amoy and Hongkong. All persons who had lived in oriental quarters in either of these cities upon arrival in the Philippines were detained for seven days at the Mariveles quarantine station. This quarantine continued until November 1, 1912. During this period 49 vessels arrived at the Mariveles quarantine station and left at the station for seven days' detention 64 crew and 537 cabin and 1,204 steerage passengers. Among the persons detained, from almost every vessel, cases of fever developed during their stay. During these four months no cases of plague occurred among those in detention.

SHIP'S GARBAGE AS AN OBSTACLE TO REDUCING RATS ALONG HARBOR FRONTS.

The service in the Philippines has continued during the year to fight for a sanitary bay and bay shore. There has been more improvement this year than during any of the 13 years that the service has been a militant factor in this work. The regulations promulgated a few years ago prohibiting the dumping of refuse, ashes, kitchen offal, and sweepings from vessels into the bay are now more generally observed, and as a consequence there is much less rat food available, which has made it possible to bring about a great reduction in the rat population on the shores of the harbors.

PHILIPPINE MARINE REGULATIONS.

During the year marine regulations were promulgated by the department of finance and justice and included in said regulations were the following paragraphs relating to quarantine:

> Par. 131. Vessels entering a harbor shall be considered in quarantine and shall keep the quarantine flag flying at the fore until boarded and given pratique by the quarantine officer. This regulation shall be subject to such exceptions as may be prescribed from time to time by the chief quarantine officer.
>
> Par. 132. No person shall be permitted to disembark from or go aboard a vessel, except the pilot and quarantine officer, until pratique has been given; unless the vessel be in distress, in which case those rendering assistance, if compelled to go on board, shall be subject to quarantine restrictions.
>
> Par. 133. All official orders and regulations of the quarantine officer shall be strictly and promptly obeyed by all persons on board or alongside while the vessel is under quarantine jurisdiction.
>
> Par. 134. All cases of sickness of a contagious or communicable character which may occur while the vessel is in port shall be at once reported in writing to the quarantine officer.
>
> Par. 135. Deaths, illness, or accidents, involving physical injury to any person on a vessel in a harbor, shall be at once reported to the collector of customs and the quarantine officer.

PUBLICATIONS.

The only publications issued by the service in the Philippines during the year were the circular letters putting into force the various changes of quarantine procedure and removing or imposing additional quarantine measures.

The service brochure entitled "Information for owners, agents, shippers, masters of vessels, and others concerned relative to quarantine procedures for vessels entering and leaving ports in the Philippine Islands" is now being rewritten and will be issued as soon as the present issue is exhausted.

The service publication entitled "A word to ship captains about quarantine" was distributed during the year to masters of all vessels calling regularly at Philippine ports.

INTERISLAND QUARANTINE.

It was not necessary at any time during the fiscal year 1913 to impose either a general or a localized interisland quarantine between ports of the Philippine Islands. When plague occurred in Manila and Iloilo special precautions were observed at the different ports of the Philippines and by frequent fumigations and rigid inspections it was possible to prevent the spread of plague from the infected center, without the necessity of delaying the vessels engaged in the interisland trade. The constant supervision of vessels while in port and their improved sanitary condition has reduced to a minimum the chances of infection being conveyed by vessels.

INSPECTION OF VESSELS IN PORT.

In 1909 the sanitary conditions in the Philippine Islands became sufficiently satisfactory to permit the discontinuance of the inspection of interisland vessels upon arrival, and to substitute therefor a certificate from the master of the vessel, which must be sent to the quarantine office one hour after arrival. It was also deemed advisable to make an inspection of such vessels while they are in port, and this consists of a record being taken of the condition of the different compartments of the vessel. The crew is inspected and those who have not been recently vaccinated are vaccinated. This latter procedure enables the service to vaccinate such members of the crew who are employed at the provincial ports of call of the vessels, at which ports most of the crew are recruited. In carrying out this work during the year a total of 2,484 inspections were made, 906 original vaccination cards were issued, 32 second and 33 subsequent vaccination cards were issued, and 601 positive "takes" from vaccinations were registered.

PHYSICAL EXAMINATIONS.

The law governing the granting of licenses to officers of vessels flying the American flag in the Philippines demands that every applicant be physically sound, and examinations to determine this condition are made of all applicants for first licenses, or renewal of license, by the officers of this service. There was a total of 283 physical examinations made at the several ports of the Philippine Islands.

A board was convened June 10, 1913, to physically examine candidates for examination for appointment to the position of assistant surgeon in the Public Health Service. Five applicants presented themselves.

CONSULAR QUARANTINE WORK.

The work at the several ports of the Philippine Islands in connection with vessels leaving the Philippines for ports in the United States, being virtually consular quarantine work, has been performed in addition to that of incoming quarantine. The granting of bills of health, and the carrying out of the various regulations, and the supervision necessary in connection with certifying cargo, disinfecting hides, baggage and effects, investigating the source of shipments of cargo and departing passengers, fumigation and inspection of departing vessels, devolves upon the service. The bathing and disinfection of the effects of steerage passengers bound for the United States has been discontinued.

The transactions of the year are shown by the following statistics:

Bills of health issued	509
Crew inspected	12, 953
Steerage passengers inspected	10, 844
Cabin passengers inspected	156
Pieces of baggage disinfected	2, 932
Crew bathed	112
Steerage passengers bathed	1, 705
Baggage inspected and passed	876
Pieces of cargo passed and certified	2, 622, 392
Vessels inspected	127
Vessels disinfected and fumigated	35

PATIENTS TREATED IN STATION HOSPITALS.

At Mariveles 2 cases of smallpox were treated, and at Cebu 1 case. At Mariveles from among those detained in quarantine there were 26 persons who were treated for a considerable period in the station hospital. These were in addition to the many cases or suspects, who on account of elevated temperature, were placed in the hospital under observation, but who were discharged when continued treatment was found unnecessary. In addition, 10 cases of hookworm were treated among aliens during the time they were in quarantine under observation during the plague quarantine of 1912.

The cholera carrier reported as having been at the station at the close of the previous fiscal year was also treated at the hospital, and later transferred to the San Lazaro cholera hospital in Manila. All of the cases treated in the hospitals recovered, including the 3 cases of smallpox.

BUILDINGS AND EQUIPMENT.

The buildings and equipment of the several quarantine stations were maintained in good repair during the year, with the exception of the disinfecting barge at Iloilo. No new buildings were constructed. Plans are now being prepared for the construction during the coming year of an additional barracks at the Mariveles quarantine station, and a contract has been let to build a concrete wharf 300 feet long which will accommodate vessels of 30 feet draft.

AID TO OTHER SERVICES.

Direct aid along the lines mentioned in previous annual reports was extended to the following services: Bureau of agriculture, bureau of health, bureau of customs, board on food and drug inspection, lighthouse establishment, Panama Canal Zone, Philippine civil service board, nautical school, foreign consular services, United States Army, charitable institutions, immigration service, weather bureau, and the board on marine examinations.

CAVITE AND OLONGAPO.

At Cavite and Olongapo medical officers of the United States Navy are made available by the admiral commanding the Philippine Naval Station for detail by the chief quarantine officer to act as quarantine officers for the inspection of vessels arriving and departing from the United States naval stations.

The following are the statistics for the year:

Number of vessels inspected	6
Number of crew inspected	1,216
Number of passengers inspected	47
Number of pieces of baggage treated	3,080
Number of bills of health issued	5

MARIVELES QUARANTINE STATION.

The Mariveles quarantine station during the year maintained its record for efficiency and amount of work performed. During the year 98 vessels, with a total of 5,303 crew, 1,137 cabin, and 1,671 steerage passengers, called at the station. Pratique was granted to 29 vessels which called only for inspection, 20 vessles called for fumigation or disinfection, and 49 vessels called to land passengers in quarantine. There were in quarantine at the station for a period of 7 days 1,805 persons. There were 66 passengers remaining in quarantine from the preceding year; also one cholera carrier; 1,752 persons entered quarantine and 13 persons remained in quarantine at the close of the fiscal year. There were vaccinated during the year 2,791 persons on incoming vessels before they proceeded to Manila. They were vaccinated just prior to their release after completing the 7 days detention. The hospital at the station was occupied a large portion of the year, 26 patients having been admitted who had diseases requiring treatment. This does not include those detained for a day or so for diagnosis. One autopsy was performed during the year. A total of 1,738 examinations of stools were made for cholera carriers.

The following table of statistics shows part of the work of the station:

Vessels at station	98
Vessels disinfected or fumigated	22
Crew bathed and effects disinfected	257
Passengers bathed and effects disinfected	1,866
Pieces of baggage disinfected	6,284
Persons vaccinated	2,791
Persons ill in quarantine	26
Days persons in quarantine	13,913

CEBU QUARANTINE STATION.

Asst. Surg. Louis Schwartz was in charge of the Cebu quarantine station during the year, and in addition thereto conducted the eye, ear, nose, and throat clinic at the Southern Islands Hospital. No quarantinable diseases were encountered on vessels arriving from foreign ports at Cebu during the year. One fatal case of typhoid fever occurred on a vessel, and autopsy and laboratory findings confirmed the clinical diagnosis. The vessel was thoroughly disinfected and the usual general precautions were taken, with the result that no further cases developed. Vigorous measures were continued throughout the year to prevent the introduction of plague rats from vessels moored at the quays. All vessels in the interisland trade making Cebu a port of call were fumigated every six months to rid them of rats and vermin. In carrying out this work there were fumigated 67 vessels, upon which were recovered 162 rats and 75 mice, together with large quantities of roaches, bugs, and insects.

The damage done by the typhoon of October 15, 1912, is discussed under the head of typhoon damage. The quarantine launch was the only small vessel afloat in Cebu Harbor on the morning after the typhoon, and the launch was used during the following day as a rescue boat and did some very excellent saving work. Only four vessels in the Cebu Harbor were able to stand the storm. All the other vessels were either lost or ashore, among them a number of large interisland steamers.

The statistics for Cebu for the year were as follows:

Vessels inspected	166
Vessels disinfected or fumigated	69
Crew inspected	3,279
Passengers inspected	2,390
Persons vaccinated	396
Pieces of cargo certified	434,033
Bills of health issued	166

ILOILO.

Iloilo is an inspection station equipped with a disinfecting barge, in charge of a medical officer of the service. The energies of the quarantine officer were expended in endeavoring to prevent the introduction of plague and cholera from the near-by foreign ports, at some of which these diseases were present during the entire year. No vessels arrived at Iloilo from a foreign port having on board quarantinable disease. The usual rat quarantine measures were vigorously carried out during the year, and in the performance of that work 294 vessels were fumigated. Plague was introduced into Iloilo in all probability either by infected rats in cargo or by bedbugs brought by passengers. Prompt measures carried out by the bureau of health resulted in the disappearance of plague within two months. Inspections were made of all cargo leaving Iloilo and other measures carried out. No spread of plague from Iloilo is known to have occurred.

The statistics for the year were as follows:

Vessels inspected	74
Vessels disinfected or fumigated	294
Crew inspected	3,107
Passengers inspected	1,008
Persons vaccinated	432
Pieces of cargo certified	464,716
Bills of health issued	132

JOLO AND ZAMBOANGA.

The importance of conducting a quarantine inspection at the southernmost ports of the Philippines, in spite of the fact that only a few vessels arrive there from foreign ports, was well illustrated by the fact that cargo which had been denied admission at Manila was later returned to Hongkong and thence shipped to Singapore and from there to the Philippines via Jolo and Zamboanga.

The cost of maintaining an inspection at Jolo and Zamboanga is only nominal, because acting assistant surgeons are employed who only receive a fee for each vessel inspected.

The statistics for the year at Jolo were as follows:

Vessels inspected	27
Bills of health issued	26
Passengers inspected	598
Crew inspected	1,808

The statistics for the year at Zamboanga were as follows:

Vessels inspected	21
Bills of health issued	21
Passengers inspected	669
Crew inspected	1,516

MANILA.

The statistics of the work performed at the port of Manila during the year were as follows:

Arriving vessels inspected	638
Bills of health issued	802
Passengers inspected	37,505

Crew inspected	56, 425
Pieces miscellaneous cargo certified	1, 723, 643
Vessels disinfected or fumigated	602
Rats examined for plague	751
Stools examined for cholera carriers	5, 259
Stools examined for hookworm	1, 387
Persons vaccinated	8, 162
Aliens medically inspected	5, 312
Physical examinations made	238
Cattle-carrying vessels disinfected	15
Vessels inspected in port	1, 484
Meat certificates viséed	8, 633

STATISTICAL TABLE.

Incoming national quarantine.

Port.	Steamers inspected.	Sail vessels inspected.	Total vessels inspected.	Vessels spoken and passed.	Vessels quarantined.	Vessels fumigated and disinfected.	Total passengers and crew inspected.
Manila	637	1	638	12	56	624	93, 930
Cavite and Olongapo	6	0	6	0	0	0	1, 255
Iloilo	74	0	74	3	0	294	4, 155
Cebu	166	0	166	0	2	69	5, 669
Zamboanga	21	0	21	0	0	0	2, 185
Jolo	25	2	27	0	0	0	2, 406

PERSONNEL.

The quarantine service in the Philippines is conducted by the United States Public Health Service and is administered by a surgeon who is known as the chief quarantine officer, who also acts as the quarantine officer for the port of Manila, and by 5 commissioned and 4 acting assistant surgeons, of whom 2 are in Manila, 1 at Mariveles, and 1 at each port of entry.

The chief quarantine officer continued to act also as director of health, which position placed him in charge of the entire sanitary and medical work of the Philippine government, including the administration of the general and dangerous communicable disease hospitals throughout the islands. Five officers were relieved by the surgeon general and 4 were ordered to the Philippines.

At the close of the fiscal year the officers of this service on duty in the Philippines and their assignments were as follows:

Surg. Victor G. Heiser, chief quarantine officer for the Philippine Islands and director of health, in charge of the bureau of quarantine service.

Manila: Surg. Victor G. Heiser, in charge; Surg. W. A. Korn, duty with the bureau of health; Asst. Surg. B. J. Duffy; Pharmacist N. C. Comfort, chief clerk.

Mariveles: Asst. Surg. D. C. Turnipseed.
Iloilo: Asst. Surg. R. H. Heterick.
Cebu: Asst. Surg. Louis Schwartz.
Olongapo: Acting Asst. Surg. U. R. Webb.
Cavite: Acting Asst. Surg. J. A. Randall.
Jolo: Acting Asst. Surg. George A. Skinner.
Zamboanga: Acting Asst. Surg. Frank W. Weed.

There were also on duty 70 attendants at the several stations of the service in the Philippines, who act as clerks, vaccinators, sanitary inspectors, crews of vessels, and station employees. One attendant was discharged, 28 resigned, and 27 new appointments were made during the year. At the close of the fiscal year there were on duty 2 American, 1 Chinese, and 67 Filipino attendants.

CURRENT EXPENDITURES.

The legislature having failed to pass an appropriation bill the Governor General again allotted funds for the current year. As this allotment is necessarily based upon the appropriation act of the legislature of more than three years ago, the difficulty of meeting obligations of the present upon the requirements of the past will be readily appreciated. The amount allotted by the executive was $62,500, to which amount $1,953.17 received from refunds and collections must be added, thus making the total amount available for the current expenses of the year $64,453.17. Of this amount, $5,000 was transferred to the public works and permanent improvements fund, thus making the net amount available for current expenses $59,453.17.

The increase which has heretofore been noted as occurring from year to year in the amount expended for current purposes is being gradually checked by the construction of concrete buildings, which do not deteriorate like the wooden construction used in the past. After providing for the outstanding obligations the net balance for the year is $247.97, which will revert to the insular treasury.

FUNDS AVAILABLE FOR ADDITIONAL IMPROVEMENTS.

Mariveles concrete wharf.—The legislature at its last session appropriated the sum of $25,000, which, added to the fund already on hand, made available a total of $52,828.79 for the construction of a modern concrete wharf at the Mariveles quarantine station.

Launch.—The legislature also provided the sum of $12,500 to be used for purchasing a launch for use on Manila Bay to replace the one now in use.

Barracks at Mariveles.—A fund of $7,553.27 is on hand for the construction of a concrete barracks at the Mariveles quarantine station.

Disinfecting building at Iloilo.—The $4,750 set aside a few years ago for a disinfecting building at Iloilo is still on hand awaiting the settlement of a controversy for a site.

Disinfecting building at Cebu.—For the purpose of providing a concrete disinfecting building at the Cebu quarantine station there is available the sum of $4,000.

CEBU TYPHOON DAMAGE COST.

The cost of repairing the damage caused to the Cebu quarantine station by the typhoon of October 15–16, 1912, was estimated to be $8,500. Repairs were made to the buildings on the station to the amount of $2,012.99 from money received from the insurance, and $990 was paid from the current contingent appropriation. The remaining damage has either not yet been repaired or it was done by station labor, for which no charge has been entered, because the employees were already on the pay roll and did the work when not occupied with their regular official duties.

Financial statement, Philippine quarantine service.

GENERAL CURRENT APPROPRIATION.

Allotment for fiscal year 1913	$62, 500. 00
Accounts payable fiscal year 1912	261. 13
Refunds and collections	1, 953. 17
Insurance collected	2, 012. 99
Total	66, 727. 29
Expended during fiscal year 1913	59, 782. 64
Transfer to public works projects	5, 000. 00
Estimated accounts payable fiscal year 1913	1, 696. 68
Unexpended balance	247. 97
Total	66, 727. 29

PUBLIC WORKS AND PERMANENT IMPROVEMENTS FUNDS.

Reconstruction Mariveles wharf	$27, 828. 79
Barracks, Mariveles	7, 732. 77
Disinfecting building, Iloilo	4, 750. 00
Disinfecting building, Cebu	4, 000. 00
Total	44, 311. 56
Expended during fiscal year 1913	179. 50
Balances left on hand:	
Reconstruction Mariveles wharf	27, 828. 79
Barracks, Mariveles	7, 553. 27
Disinfecting building, Iloilo	4, 750. 00
Disinfecting building, Cebu	4, 000. 00
Total	44, 311. 56

TOTAL EXPENDITURES DURING FISCAL YEAR.

From general appropriation	$57, 508. 52
From prior fiscal years	261. 13
From barracks, Mariveles	179. 50
From insurance collection	2, 012. 99
Grand total	59, 962. 14

EXPENDITURES BY STATION.

Manila:		
General service expenses	$19, 490. 47	
Launch expenses	4, 792. 54	
New station equipment	123. 13	
		$24, 406. 14
Mariveles:		
General service expenses	14, 293. 55	
Repairs to buildings and wharves	862. 72	
Launch expenses	180. 22	
New construction and equipment	509. 47	
		15, 845. 96
Iloilo:		
General service expenses	2, 552. 40	
Launch and barge expenses	3, 331. 68	
New station equipment	. 49	
		5, 884. 57

Cebu:		
General service expenses	$5,777.92	
Launch expenses	4,780.55	
Repairs, buildings and wharves	2,225.42	
New construction and equipment	481.48	
		$13,265.37
Jolo:		
General service expenses		345.05
Zamboanga:		
General service expenses		215.05
		59,962.14

QUARANTINE IN PORTO RICO.

Service operations in Porto Rico for the fiscal year ended June 30, 1913, embraced quarantine administration, marine hospital relief, immigration inspection, plague eradicative administration, and miscellaneous duties.

The service maintains quarantine stations at San Juan, Ponce, Mayaguez, Arecibo, Aguadilla, Fajardo, Humacao, Arroyo, Guanica, and Jobos. Marine hospital relief is furnished only at San Juan and Ponce.

PERSONNEL.

San Juan.—Chief quarantine officer, Surg. S. B. Grubbs, July 1–December 22; Passed Asst. Surg. R. H. Creel, December 23–June 30; Passed Asst. Surg. C. W. Chapin (in charge of plague laboratory); Acting Asst. Surg. Pedro del Valle Atiles; pharmacist, B. E. Holsendorf.

The total station force at San Juan included 22 attendants, 1 messenger, and 1 clerk on duty at San Juan office, 5 men as crew for launches, 1 dock inspector, 4 fumigators, and 10 employees at Miraflores quarantine station.

Ponce.—Acting Asst. Surg. Julio Ferrer Torres is in charge, with a station force of 8 attendants. All other ports in Porto Rico have acting assistant surgeons only for purpose of inspection and, when necessary, fumigation.

Quarantine transactions.

San Juan:	
Vessels inspected (incoming)	195
Vessels held in quarantine	61
Vessels fumigated	162
Total number of fumigations	452
Passengers inspected (incoming steamers)	19,525
Passengers inspected (outgoing steamers, from July 1 to Dec. 1)	1,211
Passengers detained in quarantine	321
Crew inspected (incoming vessels)	15,917
Ponce:	
Vessels inspected	141
Vessels held in quarantine	49
Vessels fumigated to kill vermin	14
Passengers (for Ponce) inspected	395
Passengers (in transit) inspected	5,489
Passengers detained in quarantine	0
Crew inspected	6,181
Bills of health issued	129
Aguadilla:	
Vessels inspected (foreign, 5; domestic, 1)	6
Passengers inspected (in transit)	3
Crew inspected	142
Bills of health issued	35

Humacao:	
Vessels inspected	5
Passengers inspected	20
Crew inspected	42
Bills of health issued	19
Arecibo:	
Vessels inspected	7
Passengers inspected	135
Crew inspected	374
Vessels held in quarantine	1
Bills of health issued	14
Fajardo:	
Vessels inspected	51
Passengers inspected	77
Crew inspected	296
Bills of health issued	33
Mayaguez:	
Vessels inspected	109
Vessels fumigated	2
Vessels held in quarantine	49
Passengers inspected	3, 468
Crew inspected	5, 513
Bills of health issued	93
Arroyo:	
Vessels inspected	2
Passengers inspected	9
Crew inspected	13
Bills of health issued	24
Ensenada (Guanica):	
Vessels inspected	2
Crew inspected	55
Bills of health issued	2
Jobos (Aguirre): Bills of health issued	13

QUARANTINE ADMINISTRATION.

In San Juan the most important and greater part of the work consists in quarantine administration.

During the past year plague in Porto Rico greatly increased the labors of the station force. (See Annual Report, 1912, pp. 62–65.)

FUMIGATION OF VESSELS.

During the first months of the fiscal year all vessels were required to be fumigated at each trip, but later on fumigation was practiced only once every three months.

At first many rodents were destroyed, but after two or three fumigations a vessel would seem to be comparatively free from rodents. A card-index system was maintained by filling out and preserving this form:

San Juan, P. R., quarantine station.

FUMIGATION RECORD.

Vessel........................ Master...................... Tonnage.................
From.................................... Bound to..............................

	Cu. cap. compt.	Lbs. sulp.
Holds........................1	....	....
2	....	....
3	....	....
4	....	....
5	....	....
Engine room and shaft alley..	....	....
Bunkers....................	....	....
Forepeak	....	....
Forecastle....................	....	....
Steerage....................	....	....
Dining saloon (first cabin)....	....	....
Pantry (first cabin)...........	....	....
Galley....................	....	....
Second cabin....................	....	....
Second cabin pantry..........	....	....
Provision storeroom...........	....	....
Living quarters................	....	....
Staterooms....................	....	....
Smoking room................	....	....
Total....................	....	....

Date..
Time of exposure..
Lighted.........M.........; opened.........M..........
Evidence of rats before fumigation.........................
Rats after fumigation, living.........; dead..........
First inspection made by.................................
Second inspection made by..............................
Opened by...
Post inspection made by.................................
Number pots not burned..................................
Dunnage or other protection to rats; how treated......
....
....
....
Pots used: Large..........; medium.......; small......

(On the reverse side make a report of all compartments which were not fumigated, why they were not, and give treatment. Also report any other pertinent information.)

A table of 10 ships is given here as an example of the effect of repeated fumigation toward ridding shipping of rodent infestation.

TABLE I.

Name of steamship.	Date.	Number of fumigation.	Number of rats killed.
Coamo	June 24	First	186
	July 15	Second	21
	Aug. 5	Third	1
	Sept. 17	Fourth	1
	Oct. 8	Fifth	0
	Oct. 28	Sixth	1
	Nov. 16	Seventh	0
	Mar. 3	Eighth	0
	June 14	Ninth	[1]3
Carolina	June 30	First	97
	July 22	Second	29
	Aug. 12	Third	12
	Sept. 3	Fourth	0
	Sept. 24	Fifth	2
	Nov. 4	Sixth	1
Brazos	Dec. 3	First	130
	Apr. 4	Second	98
San Juan	July 8	First	72
	July 30	Second	31
	Sept. 9	Third	1
	Sept. 30	Fourth	0
	Oct. 22	Fifth	0
	Nov. 12	Sixth	1
	Feb. 18	Seventh	2
Pathfinder	July 5	First	22
	Aug. 19	Second	7
	Sept. 21	Third	0
Santurce	Aug. 7	First	21
	Oct. 14	Second	0
	Nov. 6	Third	0
	Feb. 4	Fourth	1

---

[1] Mice.

TABLE I—Continued.

Name of steamship.	Date.	Number of fumigation.	Number of rats killed.
S. V. Luckenbach	July 9	First	145
	Aug. 10	Second	52
	Sept. 3	Third	2
	Sept. 24	Fourth	1
	Oct. 14	Fifth	0
	Nov. 8	Sixth	0
	Feb. 24	Seventh	[1]2
Harry Luckenbach	July 5	First	43
	Aug. 25	Second	12
	Sept. 19	Third	4
	Oct. 11	Fourth	0
	Nov. 3	Fifth	0
	Jan. 24	Sixth	0
Ponce	June 22	First	53
	July 17	Second	15
	Aug. 27	Third	8
	Oct. 3	Fourth	0
	Oct. 30	Fifth	0
	Nov. 24	Sixth	0
	Mar. 15	Seventh	0
Vasco	June 27	First	101
	July 9	Second	0
	July 25	Third	2
	Sept. 4	Fourth	0
	Sept. 30	Fifth	0
	Dec. 25	Sixth	9

[1] 1 mouse.

TABLE II.—*Fumigation report July 1, 1912–June 30, 1913.*

Total number of steam vessels fumigated	30
Total number of sail vessels fumigated	132
	162
Total number of fumigations:	
Steam vessels	107
Sail vessels	345
	452
Total amount of sulphur consumed ... pounds	154, 925
Total number of rodents killed:	
Rats	1, 055
Mice	56
	1, 111

Greatest number of rats killed at any one fumigation, steamship *S. V. Luckenbach*, 145 rats, July 9, 1912.

FUMIGATION OF CARGO.

During plague suppressive work in San Juan the importance of fumigating rat-carrying cargo from plague-infected points was emphasized by the fact that over 50 rodents were taken from cargo as the result of fumigation. Most of the rodents were taken from crated vegetables, such as garlic and onions, which have a large amount of dried stems that afford nesting place for rats and mice.

In view of this, the fumigation of all rat-carrying cargo from the Canary Islands was instituted. The greater part of cargo from the Canaries to Porto Rico consists of crated garlic and onions. As the Canaries have had plague infection at varying intervals during past few years, and there is evidence that the infection still exists, the necessity for cargo fumigation was obvious.

Owing to the prejudice against sulphur fumigation of vegetables, hydrocyanic-acid gas was substituted by direction of the bureau. This agent gave excellent results and removed the opposition of merchants toward fumigation. Custom warehouses were utilized for purpose of fumigation. Rats in cages were used as a control to the efficiency of the procedure.

To each 100 cubic feet there was used the following formula:

	Ounces.
Potassium cyanide	1
Sulphuric acid	1
Water	3

It may be stated here that in several controlled experiments it was made clearly manifest that fumigation made no appreciable difference in the vegetables as to their subsequent state of preservation or edibleness.

Cargo fumigated from infected ports.

Onions (approximately 20,000 baskets)	bushels	20,155
Potatoes (approximately 40,000 baskets)	do	13,100
Garlic (approximately 3,000 crates)	pounds	326,581

QUARANTINABLE DISEASES.

During the year plague, leprosy, and smallpox were the only quarantinable diseases present in Porto Rico.

All lepers in Porto Rico are segregated. Smallpox is now of negligible importance in Porto Rico on account of the thorough vaccination of the population. One case from steamship *Catalina* from Spain was held in quarantine 33 days.

Yellow fever was reported at various intervals as prevalent in Venezuela. To prevent the entrance of this disease into Porto Rico, no ships from Venezuela were allowed to come alongside docks, but were required to lie in open bay and to take cargo in quarantine. All passengers for Porto Rico were detained at Miraflores until completion of regulation period from port of embarkation. Three hundred and twenty-one passengers were held in quarantine detention during the year for an aggregate of 1,044 days.

EXPERIMENTAL WORK.

During the year a number of experiments having a practical bearing on quarantine methods were performed at Miraflores quarantine station.

Surg. S. B. Grubbs and Pharmacist B. E. Holsendorf conducted a series of experiments to determine the efficacy of sulphur fumigation as it is done in ships under natural conditions, more especially to ascertain the degree of protection from sulphur fumes afforded to rodents by various kinds of dunnage found in ships. A report on the result of their work was published in Public Health Report dated June 20, 1913.

Passed Asst. Surg. R. H. Creel, assisted by Pharmacist Holsendorf, conducted other experiments as to the habits of rats as pertaining to quarantine and plague eradicative measures. The result of this work was published in Public Health Report of February 28, 1913.

BUILDINGS AND PROPERTY.

During the year the service acquired new office quarters in San Juan. A site situated directly on the water front was transferred by the Navy Department to the service, under the provisions of a presidential proclamation. This site included a plot of ground of 1,040 square meters, a commodious concrete building in good state of preservation, and a wooden pier.

The interior of the building was remodeled and now affords convenient and spacious quarters for quarantine office, marine hospital out-patient relief, and a large, well-equipped laboratory.

The wooden pier was in a dilapidated condition and is now being replaced by a reinforced concrete structure costing $3,690.

The construction of four buildings at Miraflores station is now in progress and will be finished not later than December 1, 1913. They are of brick, overlain with stucco of cement, galvanized-iron roofing, and include a laundry, a lazaretto, attendants' quarters, and an executive building containing quarters for the pharmacist. A new concrete disinfecting shed will shortly be erected, replacing the present frame structure.

Several structures on the quarantine station have been made rat proof by concrete walls and repairs to floors. A number of concrete tent pavilions have been repaired and concrete benches made by the station force.

Plans are being considered for building a marine railway at Miraflores. This will enable the station force to maintain the launches in good repair and avoid the inconvenience and expense of having the work done in the Catano dry dock.

BUBONIC PLAGUE IN PORTO RICO.

As stated in the last annual report, plague was first made known in San Juan on June 19, 1912. The measures enforced for the eradication of the disease and for the protection of the outgoing shipping from San Juan proved effective, no infection having been transmitted by means of water transportation.

As a result of the routine fumigation of vessels, two infected rodents were taken from one ship, which otherwise would probably have conveyed the infection to New York, where the ship was destined.

In February, on account of the subsidence of the infection, the last plague rat having been taken four months previously, the outgoing quarantine requirements were considerably modified.

The water-front district by this time was comparatively rat proof, docks, warehouses, and sea wall being for the most part fairly free from rodent infestation. Moreover, the vessels that regularly plied between San Juan and outside ports, on account of frequent fumigation, were yielding scarcely any rats.

By reason of these factors, the frequency of fumigation was reduced to once in three months, and shipping was once more permitted to come alongside San Juan docks and to load cargo day or night, all lines and gangways being carefully protected.

Docks were required to be free of cargo and cleaned once weekly, except San Antonio dock, where the practice of shifting cargo from one rat-proof apartment to another was continued.

A system of dock inspection has been maintained throughout the year by service inspectors, who had supervision over all shipping lying along wharves. In addition, the inspector caused the water front to be kept free of any temporary rat harborage. Until March 1 there were both night and day inspections, but subsequent to that date only a day inspection has been in force.

OPERATIONS OF THE SERVICE IN HAWAII.

ANNUAL REPORT OF SERVICE TRANSACTIONS IN THE HAWAIIAN ISLANDS FOR THE FISCAL YEAR ENDED JUNE 30, 1913.

The service operations in the islands are under the supervision of the chief quarantine officer with headquarters at Honolulu, and are divided under four heads:

1. Quarantine.
2. Plague laboratory.
3. Marine hospital.
4. Immigration.

GENERAL.

The quarantinable diseases prevailed during the year at the majority of foreign ports touched at by vessels arriving at this port. Plague was present throughout the year on the west coast of South America and in Japan and China. Hongkong, where the disease has been epidemic since 1894, experienced one of the most severe outbreaks of the disease, there being 1,838 cases in 1912.

Cholera and smallpox prevailed at Chinese and Japanese ports, and at Hongkong more or less smallpox was present.

QUARANTINE STATION.

With the expected early installation of the new sewer system the Honolulu quarantine station will be thoroughly equipped to handle any vessel that may arrive with quarantinable disease on board. At Hilo the Federal Government is spending a large sum of money in the construction of a breakwater and in dredging and clearing the harbor, while the Territorial government has under construction a wharf 1,000 feet long, which will accommodate vessels drawing 35 feet of water.

The Japanese steamship company, the Toyo Kisen Kaisha, have already instituted a sailing from Japan to the west coast of South America via Hilo, and if the venture proves a success a permanent schedule will be maintained.

In view of these facts, it is probable that the service will have to add to the quarantine equipment for handling vessels at that port.

At the subports of Mahukona, Kahului, Lahaina, Koloa, and Makaweli incoming vessels were boarded and inspected by acting assistant surgeons of the service.

Vessels inspected.—Four hundred and eighty vessels were boarded and inspected by service officers upon arrival at ports of entry in the Hawaiian Islands, namely, Honolulu 418, Hilo 29, Mahukona 13, Makaweli 4, Koloa 1, Kahului 12, and Lahaina 3.

Quarantine certificates.—Three hundred and forty-eight certificates were issued at Honolulu and 71 at Hilo to vessels departing for

United States ports. These certificates stated that during the time the vessel was in port the required precautions to prevent rats from gaining access to the vessel had been observed.

Vessels fumigated.—One hundred and eighty-two vessels were fumigated at Honolulu, 50 at Hilo, and 1 at Koloa for the purpose of rat eradication.

PLAGUE IN HAWAII.

During the year no cases of plague, either human or animal, have occurred on any of the islands, except that of Hawaii, but on this island the disease, which has been present in man and rodents for the past 13 years, continued to prevail in spite of a most active rat campaign.

No plague in rodents was found from April 24 to September 9, 1912, though the rat-catching force was increased and a larger rat yield obtained. During the year 137,581 rats were trapped in the Hilo and Hamakua districts, of which 20 were found to be plague infected.

The rat yield in plague infection in rodents is shown in the following table:

Month.	Hilo district.		Hamakua district.	
	Number of rats.	Infected rats.	Number of rats.	Infected rats.
July	2,684	....	6,540	....
August	3,888	....	8,518	....
September	2,972	1	6,749	....
October	3,586	....	6,642	1
November	4,722	....	9,533	1
December	3,429	....	6,583	4
January	3,233	1	5,487	3
February	3,673	1	6,895	5
March	4,101	....	7,645	1
April	5,170	....	9,721	....
May	6,027	....	7,689	1
June	6,087	....	6,007	1
Total	49,572	3	88,009	17

Eight cases of human plague occurred in the Hamakua district during the year, of which four were of the bubonic and four of the pneumonic type. Five of these cases occurred in the village of Kukuihaele, two in the village of Honokaa, and one in the person of a rat catcher at Pepeekeo. The Territorial board of health increased the field force along the Hamakua coast when the four cases of plague occured in the spring of 1912, an increase of funds was allowed, and in addition the various plantation owners aided by paying the salaries of the sanitary inspectors, but so far not much success has marked the campaign of stamping out the various foci.

The board of health are concentrating most of their attention on trapping rats in the villages and plantation camps and are attempting to keep them as rat free as possible.

As previously stated, the various plantations are working with the board of health in their plague work on Hawaii and it is considered worthy of mention here that during the years 1910 and 1911 the plantations spent $514,998.30 for permanent improvements and repairs to employees' quarters, wash houses, sewers, outbuildings, etc., while $110,317.95 was expended for sanitation, labor, inspectors' and rat catchers' salary, disinfectants, supplies rat campaign, and any other item that would not come under the head of improvements.

Expressed in proportion to the sugar output, which was 364,309 tons for the two years, for permanent improvements $34.82 was spent per ton and $8.82 for sanitation, which is certainly a very creditable showing and illustrates the spirit of assistance and cooperation that is being rendered.

VESSELS ARRIVING WITH QUARANTINABLE DISEASES OR HAVING HAD SAME DURING THE VOYAGE.

Plague.—The British steamship *Persia* arrived July 2, 1912, from Hongkong, Shanghai, Nagasaki, Kobe, and Yokohama. She sailed from Hongkong June 11, 1912, and at inspection of the personnel just before departure two Filipinos were rejected and sent ashore on account of having fever. These men later died of plague.

The vessel on arrival at Yokohama was detained by the Japanese authorities, all the personnel removed, bathed, and effects disinfected, and the vessel fumigated with carbon-monoxide gas. On the vessel's arrival at Honolulu the entire personnel were carefully examined, temperatures taken, and, as it was not considered that the vessel or her personnel were infected, pratique was granted.

This vessel's history is of some interest, so will be given in detail. She was fumigated at Hongkong June 7, just after coming off the dry dock, for the purpose of destroying rats, of which 20 were killed. The following day 188 Filipinos were transshipped to her from the British steamship *Taming*, which had arrived a few hours previously from Manila. It was stated that these Filipinos were watched both on the *Taming* and the *Persia* and not allowed ashore in Hongkong between the date of arrival, June 8, and the departure, June 11, of the *Persia;* however it is more than probable that either some of them went ashore in Hongkong and visited in the local Filipino colony or else Filipinos who had been rejected from previous vessels went on board the *Taming* and were transshipped to the *Persia* or later boarded the vessel after the transfer was made.

Hongkong at the time was badly infected with plague, there being 274 cases with 206 deaths for the two weeks ended June 6, 1912.

As stated above, the vessel was fumigated at Hongkong June 7, with the result that 20 rats were killed; at the Japanese quarantine station at Nagasaki she was again fumigated with carbon-monoxide gas and two rats obtained, and on arrival at San Francisco she was fumigated, July 13, and 25 rats killed; thus the three fumigations during a period of a little over one month resulted in killing 47 rats.

American steamship *Manchuria* arrived August 8, 1912, with the history of having been detained in quarantine at Nagahama on account of the death from plague at Hongkong of a Filipino who was rejected and sent ashore from the vessel at that port before departure.

The *Manchuria* arrived at Hongkong July 7 and went on the dry dock, where she remained until July 11, when she came off and went to anchor. On this day 183 Filipinos were transshipped to her at 3 p. m. from the British steamship *Kaifong* which had arrived from Manila two hours previously. On July 15, 13 Filipinos embarked with the other steerage passengers from Hongkong and on inspection of the personnel by Surg. Brown 2 Chinese and 20 Filipinos were rejected and sent ashore on account of having fever, 1 of these Filipinos later dying of plague. On arrival at Honolulu the personnel were found all well, and as there had been no suspicious cases of illness during the voyage the vessel was granted pratique. The Hongkong health authorities credited Manila with being the source of infection of this plague case, but the matter was thoroughly investigated by Surg. Heiser, who found that the man left Iloilo on July 6, Manila July 9, arrived at Hongkong on July 11, and developed plague July 18. Again in this case it is more than probable that the infection was obtained in Hongkong and that the man was ashore and visited in the local Filipino colony, which had grown to some proportions by the additions of rejected persons from the various steamers.

Suspected plague.—The Japanese steamship *Chiyo Maru* arrived August 13, 1912, from Chinese and Japanese ports with a steerage passenger ill in the ship's hospital with a bubo in the left groin.

The man was examined, the bubo aspirated, and about 5 c. c. of pus obtained, which when stained and examined showed pus organisms. The adenitis was undoubtedly of venereal origin and the vessel was accordingly granted pratique.

British steamship *Makura* arrived November 5, 1912, from Sydney, Auckland, and Suva, with a coal passer ill with an inguinal adenitis. The man was taken sick October 29, 1912, with pain and swelling in the left groin, which became tender and painful when he walked. He reported to the ship's surgeon who applied iodine and excused him from duty for a few days. On arrival the case was examined and in the left groin was a swelling about the size of a golf ball, which was tender to manipulation and could not be differentiated from surrounding tissues. Temperature was 39.6 and pulse 110. Aspiration of the swelling furnished a few drops of blood-stained fluid, which when stained and examined showed numerous biscuit-shaped and a few bipolar organisms.

The ship's surgeon had failed to keep any record of the case whatsoever and as no appreciable cause could be found to account for the adenitis, and as the organisms found were suspicious of pest, the vessel was accordingly detained in quarantine and those passengers for Honolulu disembarked and detained at the quarantine station for observation. After removal of the patient to the quarantine station the gland was incised, cultures made, and a guinea pig inoculated. On November 9 the cultures and guinea pig being negative the case was considered not one of plague and the passengers released from quarantine. The surgeon of the *Makura* failed to keep any clinical record whatsoever, nor did he seem to realize that the case might be one of plague, therefore requiring isolation.

American steamship *Siberia* arrived March 10, 1913, from China and Japan with a second-class passenger isolated in the contagious hospital since March 4. Examination showed a bubo in the left groin which was sharply defined from the surrounding tissue and was discharging by two openings; stained smears showed the adenitis to be due to a specific urethritis; the ship was accordingly granted pratique.

Leprosy.—The Japanese steamship *Chiyo Maru* arriving August 13, 1912, brought a steerage passenger who was found to have leprosy. The patient was born on the island of Maui of this territory in 1893, of Japanese parentage. He attended school on Maui and also the normal school at Honolulu until 1910 when he left for Japan. As the man was a citizen of Hawaii he could not be deported and was turned over to the board of health, but he voluntarily offered to return to Japan in preference to going to Molokai, so was deported on the steamship *Siberia*, August 19.

American steamship *Siberia* arrived January 15, 1913, from San Francisco en route to Japan, and on inspection of the personnel a case of leprosy was discovered amongst the steerage passengers in the person of a Japanese. This man arrived in California from Japan in 1907 and has lived practically all the time since then at Monterey, Cal., where he worked as a fisherman. About June, 1912, he consulted a local physician for some enlarged spots on his face, but obtained no relief and then called in a Japanese doctor, who informed him his condition was due to eating impure fish and advised him to return to Japan. Examination showed the case to be one of leprosy of the tubercular variety, with marked infiltration and nodules of the forehead, face, cheeks, nose, and lobes of the ears. The man was confined in the ship's hospital during the stay of the vessel in this port.

Japanese steamship *Chiyo Maru* arrived March 31, 1913, from Japanese ports with a second-class passenger isolated in the ship's hospital with leprosy. The patient, a Hawaiian, was born in the Hawaiian Islands, in 1876, discovered he had leprosy in 1900, and in order to avoid being apprehended and sent to Molokai, he left for Japan, where he took the baths, with the result that the course of the disease was checked, for he states that he had no further manifestations until last October, when the disease became very noticeable in a short time. During his stay in Japan he worked for the Standard Oil Co. When he decided to return to Hawaii, he had a friend purchase a ticket, and concealing his appearance by the use of an artificial nose mask, he boarded the *Chiyo Maru* a few minutes before her departure from Yokohama. He was detected the following morning by the surgeon of the vessel and isolated. On arrival at Honolulu he was turned over to the board of health and the hospital fumigated.

Smallpox.—Only one vessel arrived with a history of having had smallpox during the voyage.

The steamship *Shinyo Maru* arrived May 19, 1913, with the history of having landed a case of smallpox and contacts at the Japanese quarantine station at Nagahama. As there had been no further cases, and as all the required precautions had been taken, the vessel after inspection, was granted pratique.

VESSELS ARRIVING WITH CONTAGIOUS BUT NONQUARANTINABLE DISEASES ON BOARD.

Varicella.—Five vessels arrived with this disease on board, the steamships *China, Nile, Manchuria,* and *Siberia,* from oriental ports, and the steamship *Sierra* from San Francisco. All of the cases, except the one on the steamship *Nile,* who was a through passenger to San Francisco, were landed and turned over to the Territorial board of health. As was the case during the previous year, almost all the cases occurred in Filipinos, and it is very probable that the infection was obtained at Nagasaki, where, according to unofficial reports, the disease was unusually prevalent.

In this connection it might be stated that a number of cases of smallpox amongst plantation workers on the several islands were reported during the year, but in every instance observation and examination proved them all, without exceptions, to be cases of varicella.

Cerebro-spinal meningitis.—The United States Army transport *Sheridan* arrived from San Francisco January 14, 1913, with a recruit ill with the disease. The case was reported to the board of health and allowed to be removed from the vessel by the Army authorities.

Measles.—The British steamship *Willesden* arrived March 30, 1913, from Gibraltar, with 1,391 Spanish and Portuguese immigrants, and on account of an epidemic of measles on board she was, upon the request of the president of the Territorial board of health, taken to quarantine wharf and the immigrants disembarked, bathed, baggage disinfected, and placed under observation at the quarantine station, at the expense of the board of health.

During the voyage from Europe, which took 50 days, there had occurred 12 births, 20 deaths, and 273 cases of illness; of the latter there were 162 cases of measles, 4 of pneumonia, 4 of pleurisy, 1 of tuberculosis, 3 of enteritis, and 112 miscellaneous. The deaths were due to measles and complications, which were mostly hyperpyrexia, heat exhaustion, debility, marasmus, diarrhea, and broncho-pneumonia.

The immigrants remained under observation at the station from March 31 to April 23, during which period there were 3 births, 204 cases of illness, and 20 deaths.

Measles caused many cases of illness, there being 127 of this disease alone, while there were 15 cases of marasmus, 1 of typhoid, 1 of meningitis, 1 of dementia, 13 of gonorrhea, and 1 of syphilis, besides innumerable minor ailments. The deaths were principally due to the gastro-intestinal diseases of childhood, marasmus, and measles.

AID RENDERED.

Board of health.—On account of the presence of measles, 1,391 Spanish and Portuguese immigrants arriving on the steamship *Willesden* were, upon the request of the board of health, taken to the station, bathed, their effects disinfected, and then placed in detention from March 31 to April 23.

In compliance with the request of the board of health 15 vessels were fumigated upon arrival for the purpose of destroying mosquitoes on board.

One vessel was disinfected on account of the presence of communicable diseases amongst the passengers.

Thirty-five cremations were done during the year at the station for the board of health, of which 24 were Spanish and Portuguese immigrants dying at the quarantine station during detention, while the remaining 11 were persons dying of leprosy.

The chief quarantine officer, upon the request of the governor, accompanied Dr. J. S. B. Pratt, president of the Territorial board of health to the island of Hawaii, to investigate the plague situation there. Several plantations and villages were visited and with but one exception they were all found to be in excellent sanitary condition and reflected great credit upon chief sanitary inspector Mr. D. S. Bowman.

Many cultural and inoculation experiments were made in the service laboratory for the board of health in suspected cases of plague, typhoid, and pneumonia.

Collector of customs.—One cremation of a customs employee was made upon the request of the collector, and the latter was furnished with medical advice in the cases of illnesss of several customs employees.

United States Army.—Two cremations of quartermaster employees were done upon the request of the depot quartermaster.

The mine planter *General Samuel Ringold* was twice fumigated for the purpose of eradicating vermin on board.

United States district attorney.—One autopsy was made in a murder case, upon the request of the United States district attorney by an officer of the service.

Service officers were called upon for medical testimony in several cases before the United States district courts and the district attorney was furnished with information and data, upon medical subjects, on several occasions during the year.

Immigration.—Three hundred and forty-six Chinese residents of the Hawaiian Islands were examined, upon the request of the inspector in charge, prior to their departure for China to determine their physical condition. Thirty-three were found to have trachoma, 1 carcinoma, 1 beriberi, 1 curvature of spine, and 2 were blind in one eye.

United States Revenue-Cutter Service.—Sixty-three seamen were treated at the out-patient office and 17 in hospital. Thirty-one physical examinations were made of candidates for enlistment One commissioned officer was physically examined for promotion by a board of medical officers of this station.

Commissioned medical officers of the service accompanied the U. S. revenue cutter *Thetis* on her various cruises.

PLAGUE LABORATORY.

No plague infected rats were found in Honolulu or on the island of Oahu during the year.

Fourteen thousand and seventy-one rats and mongoose were examined bacteriologically and found to be negative for plague.

Cultures and specimens from suspected plague cases on the island of Hawaii were referred to the laboratory for diagnosis.

Many Widal tests for typhoid of cases in Queen's Hospital were made, besides many inoculation and cultural experiments for the board of health.

Transactions in plague laboratory.

Total rats, mice, and mongoose taken	16, 788
Rats trapped	15, 317
Mongoose trapped	325
Rats found dead	9
Rats killed by sulphur dioxide	533
Rats shot from trees	604
Examined bacteriologically	14, 071
Showing pest infection	0

Classification of rats trapped:	
Mus alexandrinus	2, 006
Mus musculus	5, 166
Mus norvegicus	1, 198
Mus rattus	6, 947
Classification of rats found dead:	
Mus musculus	1
Mus norvegicus	2
Mus rattus	6
Classification of rats killed by sulphur dioxide:	
Mus alexandrinus	162
Mus musculus	16
Mus norvegicus	14
Mus rattus	340
Classification of rats shot from trees:	
Mus alexandrinus	248
Mus rattus	356
Total number of rat trappers	9
Number of traps set daily	1, 269
Decrease in number of rats, mice, and mongoose caught as compared with last year	10, 447

HILO.

Rats referred to this laboratory for bacteriological diagnosis	1
Rats still under investigation	1
Human cases referred to this laboratory for bacteriological diagnosis	1
Human cases proven to be plague infected	1

Rat campaign, Honolulu.

Sixteen thousand seven hundred and eighty-eight rats and mongoose were taken in Honolulu, 15,642 being trapped, 9 found dead, 533 killed by sulphur dioxide, and 604 being shot from trees.

Five rat catchers were employed for trapping rats in Honolulu from July 1, 1912, to February 1, 1913, when, owing to an increase of funds for this work, four additional trappers were employed with a much increased rat yield.

A careful record is kept of each trapper's work and he is expected to bring a certain number of rats daily. Should there be a falling off in a trapper's work, a warning usually suffices to restore his work to a satisfactory basis.

Quarantine transactions at Honolulu.

Vessels—	
Inspected and passed	418
Boarded and passed	41
Inspected and detained for fumigation for mosquitoes	15
Inspected and detained for fumigation for rat quarantine	29
Inspected and detained for observation	4
Disinfected	1
Fumigated for rat quarantine	153
Detained by request of the board of health	1
Fumigated by request	5
Arriving with quarantinable disease or having had same on board during voyage	3
Rats and mice killed on vessels by fumigation	518
Passengers inspected	80, 741
Passengers detained	553
Passengers detained by request of board of health	1, 389
Crews inspected	33, 816
Crews detained	646
Crews detained by request of the board of health	66
Persons treated in quarantine hospital upon request of board of health	204

Vessels—Continued.

Persons treated for quarantinable diseases	1
Persons bathed	1,463
Pieces of baggage disinfected	2,451
Pieces of freight inspected and passed	53,945
Hides disinfected	12,188
Autopsies	6
Births	3
Deaths	20
Rats and mongoose trapped and destroyed	16,788
Cremations	40

Quarantine transactions at subports.

	Hilo.	Kahului.	Mahukona.	Lahaina.	Makaweli.	Koloa.
Vessels inspected and passed	29	12	13	3	4	1
Vessels fumigated for rat quarantine	50	0	0	0	0	1
Outgoing quarantine certificates issued to vessels	71	0	0	0	0	0
Baggage inspected and passed	2,509	0	0	0	0	0
Baggage and freight disinfected	522	0	0	0	0	0
Hides disinfected	1,565	0	0	0	0	0
Passengers inspected and passed	0	0	0	0	1	0
Crews inspected and passed	597	330	153	41	73	21

Table giving transactions at national quarantine stations for the fiscal year ended June 30, 1913.

Stations.	Steamers inspected.	Sailing vessels inspected.	Total vessels inspected.	Vessels spoken and passed.	Vessels quarantined.	Vessels fumigated.	Total passengers and crews inspected.
Alexandria, Va	....	2	2	....	....	....	60
Beaufort, S. C	0	0	0	0	0	0	0
Biscayne Bay	7	109	116	205	0	21	4,516
Bocagrande, Fla	....	90	90	63	....	3	832
Brunswick, Ga	21	5	26	38	0	16	1,886
Cape Charles	620	14	634	0	3	62	42,577
Cape Fear	54	2	56	0	0	11	1,704
Charleston, S. C	130	9	139	....	....	7	3,814
Columbia River, Oreg	63	92	155	0	0	64	4,993
Coos Bay (substation)	....	5	5	....	....	....	....
Cumberland Sound	88	11	99	57	0	27	3,754
Delaware Breakwater	7	6	13	0	0	0	1,182
Delaware River (Philadelphia)	352	15	367	....	....	194	43,474
Eagle Pass	0	0	0	0	0	0	19,791
Eastport, Me	796	61	857	....	....	....	50,881
El Paso, Tex	....	....	....	....	....	....	10,000
Eureka, Cal	6	5	11	0	0	1	314
Georgetown, S. C	0	0	0	0	0	0	0
Gulf Quarantine	....	220	220	8	....	122	2,938
Key West, Fla	517	88	605	0	0	25	51,995
Ketchikan, Alaska	66	0	66	0	0	0	7,107
Laredo, Tex	....	....	....	....	....	....	48,683
Mobile, Ala	418	176	594	0	11	139	13,532
New Orleans, La	1,043	19	1,062	186	82	187	28,469
Pascagoula, Miss	....	37	37	13	....	36	982
Pensacola, Fla	72	55	127	0	5	103	4,705
Perth Amboy, N. J	115	2	117	9	0	64	3,227
Port Angeles, Wash	....	1	1	....	....	....	....
Port Harford, Cal	....	59	59	0	0	0	2,197
Port Inglis, Fla	30	0	30	....	....	14	965
Portland, Me	216	43	259	0	4	9	46,609
Port Townsend, Wash	164	60	224	2	0	42	29,623
Providence	30	13	43	....	....	3	23,499
Reedy Island, Cal	352	15	367	0	0	194	43,474
Redondo, Cal	0	0	0	0	0	0	0
San Diego, Cal	375	2	377	0	0	4	9,842
San Francisco, Cal	439	110	549	5	2	218	74,584
Santa Barbara, Cal	1	10	11	0	0	0	213
San Pedro, Cal	81	4	85	....	....	6	4,027
Savannah, Ga	83	1	84	7	....	29	3,647
South Bend, Wash	....	5	5	....	....	....	....

Table giving transactions at national quarantine stations for the fiscal year ended June 30, 1913—Continued.

Stations.	Steamers inspected.	Sailing vessels inspected.	Total vessels inspected.	Vessels spoken and passed.	Vessels quarantined.	Vessels fumigated.	Total passengers and crews inspected.
St. Andrews, Fla	2	28	30	0	0	5	0
St. George Sound	1	35	36	0	0	25	335
St. Johns River	55	31	86	227	0	11	1,758
St. Josephs, Fla	15	9	24	0	0	0	26
Tampa Bay, Fla	95	56	151	0	6	85	6,263
Washington, N. C	0	0	0	0	0	0	0
Yaquina Bay, Oreg	0	0	0	0	0	0	0
Port Royal, S. C	0	0	0	0	0	0	0
Fort Bragg, Cal	0	2	2	0	0	0	0
Brownsville, Tex	....	....	....	....	....	....	1,477
Juneau, Alaska	0	0	0	0	0	0	0
Tacoma, Wash	0	0	0	0	0	10	....
Total	6,314	1,507	7,821	820	113	1,737	599,955

Table giving foreign, oriental, and insular stations and transactions for the fiscal year ended June 30, 1913.

Stations.	Total number of vessels inspected.	Number of vessels fumigated.	Total number of passengers and crews inspected.
Aguadilla, P. R	6	0	180
Arecibo, P. R	7	0	510
Arroyo, P. R	2	0	22
Callao, Peru	182	160	22,186
Cavite, P. I	6	0	1,255
Cebu, P. I	166	69	5,669
Puerto Mexico, Mexico	58	10	3,869
Fajardo, P. R	51	0	473
Guanica, P. R	2	0	55
Guayaquil, Ecuador	80	77	8,010
Habana, Cuba	1,107	360	103,114
Hilo, Hawaii	29	50	597
Honkong, China	430	151	80,483
Honolulu, Hawaii	418	212	114,557
Humacao, P. R	5	0	62
Iloilo, P. I	74	294	4,155
Jolo, P. I	27	0	2,406
Kahului, Hawaii	12	0	330
Kobe, Japan	279	36	80,479
Koloa, Kauai, Hawaii	1	....	21
Lahaina, Maui, Hawaii	3	....	41
Libau, Russia	28	4	44,695
Makaweli, Hawaii	4	....	73
Mahukona, Hawaii	13	....	153
Manila, P. I	638	624	93,930
Manzanillo, Mexico	41	6	5,226
Mayaguez, P. R	109	2	8,981
Messina, Italy	15	....	1,672
Naples, Italy	279	0	178,407
Palermo, Italy	66	0	20,993
Ponce, P. R	141	14	12,063
Progreso, Mexico	48	....	4,389
San Juan, P. R	195	452	36,653
Shanghai, China	153	26	37,104
Vera Cruz	14	6	2,676
Yokohama, Japan	307	62	98,881
Zamboanga, P. I	21	0	2,185
Total	5,017	2,615	976,555

NOTE.—Reports from Amoy, China, and La Guaira, Venezuela, were not received in time to be included.

FOREIGN QUARANTINE.

The duties of officers of the Public Health and Marine-Hospital Service detailed at foreign ports are as follows:

First. The investigation into the previous whereabouts and the past and present sanitary history of all vessels destined for ports in the United States, its possessions, and dependencies.

Second. The inspection of vessels, crews, and passengers, and the certification of freight.

Third. The fumigation of ships to kill rats and mosquitoes, or the disinfection of ships when necessary.

Fourth. The observation, if necessary, under detention of intending passengers for ports in the United States and its dependencies.

Fifth. Weekly reports of transactions.

Sixth. Weekly reports as to the health and sanitary conditions of the foreign port, and when possible of the country contiguous thereto.

Seventh. The certification, in conjunction with the United States consular officers, of the bills of health issued, said certificates to be made just prior to the departure of the ship and to cover all requirements provided for by the United States quarantine regulations.

FRUIT PORT INSPECTION SERVICE.

The fruit port inspection service was not maintained during this fiscal year in accordance with the previous custom of maintaining acting assistant surgeons during the close quarantine season (Apr. 1 to Nov. 1) in the offices of the American consuls in the various Central American and West Indian fruit ports. The fruit ports were subjected to regular inspections by Acting Asst. Surg. R. P. Ames, who acted under the general supervision of Surg. J. H. White.

Because of the report of Capt. Potter, of the British Royal Army Medical Corps, to the effect that the prevailing ''vomiting sickness'' in Jamaica in the autumn of 1912 was probably yellow fever, the bureau directed Surg. J. H. White to extend his inspection to Jamaica and vicinity.

He spent, in accordance with this order, some days in Port Antonio and Kingston, visiting the hospitals and nearby small villages and seeing the people. The chief medical officer of Jamaica, Dr. Kerr, the colonial bacteriologist, Dr. Scott, and other physicians, extended Dr. White the utmost courtesy and every available facility, with the result that he submits report that in his opinion the vomiting sickness is as stated by Drs. Kerr and Scott, a meningitis, and could not possibly have been yellow fever for the following reasons:

It occurs in winter and ceases with the first warm weather.

It occurs in the hills and seldom on the coast.

It attacks blacks in preference to whites or Hindus.

It occurs most often where stegomyiæ are least frequent.

The interval of time between primary and secondary cases is not sufficient for yellow fever.

Surg. White was detailed to visit the coast towns of Mexico and report on conditions with relation to the possible incidence of yellow fever at any of these towns, reports that he visited all the eastern littoral of Mexico having any commercial relations with this country, and found as follows:

Yellow fever was existent at the time of his visit July 6, 1913, in Campeche, and in semiendemic form.

It did not exist either at Merida, Progreso, Frontera, Puerto Mexico, Vera Cruz, Tampico, or at San Juan Bautista.

He was unable to reach Carmen on account of insurrectionists.

He draws the conclusion that the present condition in Campeche is a residuum from former endemic conditions in Merida, which condition was eradicated in 1912, while the extension in Campeche escaped notice, and is now giving cause for serious concern, and may, unless extreme precautions are adopted, reinfect the city of Merida.

He recommended the removal of quarantine restrictions from Vera Cruz and Tampico entirely, and that at Frontera ships be allowed to enter the port and passengers to embark after five days' observation by Acting Asst. Surg. Eaves, but at Progreso no passengers be permitted, save certified immunes.

Surg. White was also directed to visit and report upon the ports of Belize, Livingston, Puerto Barrios, Puerto Cortez, Puerto Limon, Bocas del Toro, and Almirante, and the interior towns having sanitary importance in the countries visited. On completion of this inspection in May, 1913, he reported as follows:

> Belize, capital town of the British colony of the same name, is in very good sanitary condition, though antimosquito work is needed, and the quarantine maintained against yellow fever ports is the best of all quarantines between the United States and Colon, save at Bocas del Toro.

Guatemala.—Livingston having almost no commerce is becoming a negligible factor, and except for five or six white families, is nothing more than an isolated Carib village whose interior communication is with the mountains around Coban, and to which no ship can come nearer than two miles in safety on account of shoal water.

It is nevertheless visited from time to time by the service representative Dr. R. P. Ames, and should be so visited as long as any shipping at all goes there.

Puerto Barrios, Guatemala, nominally a subport of Livingston but de facto the only real port on this coast of the Republic, lies about 15 miles east of Livingston, has deep water approach, a fine wharf, and is the terminus of the Guatemala system of railroads reaching to the Pacific, and soon to extend into Mexico to the west and Salvador to the east and south, which commercial facilities conjoined with proximity to the States, makes Barrios the most important port, from a sanitary point of view, on the whole Central American coast.

The town is in the making, and has so far been rather badly made, being built upon a marsh, and only spots filled in. Some fights have been made upon the stegomyiæ, but none on malarial mosquitoes. The United Fruit Co. and the Guatemala Railroad Co. both endeavor to keep down the former in their own interest, and in justice it must be said that the anopheles is here almost beyond control.

The population is small and consequently Dr. Ames can see any cases which might be suspicious, and the probability of a concealed outbreak of yellow fever is not great.

Incidentally Dr. White reports that the new dock here is a steel and concrete rat-proof structure, of similar but larger type to the one at Almirante referred to later.

Of the interior cities of Guatemala the report states that they were to a large extent stegomyia free—not many being seen in Zacapa and

Gualan, but a surprise was encountered in finding a few in Guatemala City at an altitude of 5,000 feet.

Honduras.—Puerto Cortez is pronouncedly infected with both pernicious forms of mosquitoes, with only spasmodic efforts made to improve conditions with regard to either, though there is promise of filling and drainage of low land back of and in the town, and improved water supply, which should better conditions.

This place is visited frequently by Acting Asst. Surg. Ames, who has a number of intimate friends resident there who will also keep him in touch with the situation, and warn him if any infection develops between his visits.

Costa Rica.—Puerto Limon, the only port on this coast, is one of the cleanest and best policed towns in Central America, and save for an unusual increment of anopheles from swamps in the rear of town, is as usual not infested to any great degree by mosquitoes. It is noted with regret by Surg. White that Dr. Emilio Eccheverria severs his connection with the medical staff of the United Fruit Co. at Port Limon.

In the past Dr. Eccheverria has been frank and prompt in reporting yellow fever, and was therefore of great value to this service as well as his employers.

Republic of Panama.—Bocas del Toro is reported clean and remarkably free from stegomyia, thanks to the painstaking endeavors of its health officer, Dr. Paul Osterhout, formerly acting assistant surgeon United States Public Health and Marine-Hospital Service, and the reclamation work done in the past few years by the Republic, which has made a dry sandy island out of a mud flat covered by every tide.

Almirante.—This is the loading station of the United Fruit Co. for bananas, and as yet is practically nothing more, though there is some tendency toward building shacks in the marsh edge, just outside the company's property, which may (and probably will) develop stegomyia breeding grounds, where at present none appear to be.

Summary.—These ports fall naturally into two classes, (1) those above Cape Gracias which need constant watching, and for which an acting assistant surgeon has been kept on duty every year, and (2) those below Cape Gracias, which, by reason of being five days' sail from New Orleans, as well as in superior sanitary condition, offer little or no menace to the United States coast.

Of the first class, Belize is very carefully watched by its own officials, and its trade relations, save for occasional schooners from Mexico, are with safe countries in so far as yellow fever is concerned.

Livingston and Barrios also have scant trade relations with any danger point, the greatest threat to Barrios being naturally by rail, and for this reason Surg. White states that he has suggested to Acting Asst. Surg. Ames a most vigilant supervision of interior conditions as being increasingly necessary as railroad extension proceeds farther into other lands.

The present safety of Puerto Cortez lies in its trade relations also, and unless one of the other fruit ports become infected it can hardly do so, as its rail communication only goes back to San Pedro Sula and does not cross the Cordilleras, as in the case of the Guatemalan road.

The report closes with the expression of opinion based upon eight years familiarity with this coast, that the greatest risk of infection by far is via the Guatemalan Railroad, and not by sea, and that the infection of one of these northern fruit ports may, and probably will, result in the infection of all, and therefore that it would be well to watch them the whole year round.

INSPECTION AT OTHER FOREIGN PORTS.

HABANA, CUBA.

The following is an extract from the report of Acting Asst. Surg. Richard Wilson for the fiscal year ending June 30, 1913:

Quarantine transactions.

Bills of health issued	1, 477
Outgoing vessels inspected (included in the above)	1, 107
Members of the crews of outgoing vessels inspected	59, 199
Passengers of outgoing vessels inspected	43, 915
Vaccination certificates issued for the Canal Zone and Panama	113
Vessels fumigated to kill rats	360
Vessels fumigated by the Cuban authorities under the supervision of this service	108
Vessels recommended to be fumigated on arrival at a United States port	44
Passengers individually certified	1, 377
Passengers certified after detention at Triscornia	231
Vessels certified as having complied with paragraph 35, United States Quarantine Regulations	171
Vessels certified as taking precautions against ingress of rats	205
Vessels neglecting precautions against ingress of rats and so certified on bill of health	7
Vessels remaining in port after issuance of bill of health	4
Certificates issued to passengers from Mexico	225

Bills of health were issued to 1,477 vessels bound for the United States and its dependencies. This gives an average of 123 per month. The smallest number in one month was 97 in August, 1912, from which time it increased slowly until it reached 151 in March, 1913, which is the highest number issued in one month. After that it fell gradually until the end of the fiscal year, there being 124 in June, 1913.

Of the 1,477 vessels receiving bills of health, 1,107 were inspected before leaving, because they were going direct to an American port. The other 370 vessels were going via Cuban or other foreign ports.

The members of the crews of the vessels inspected numbered 59,199. The passengers inspected were 43,915.

There were 113 vaccination certificates issued for the Canal Zone and Panama.

Habana was declared a plague-infected port in July, 1912. This caused great activity in the outgoing quarantine work, some of which has continued to the end of the fiscal year. The most important measure was the general fumigation of vessels to kill rats. For this purpose, the service fumigated 360 vessels. In addition to this, 108 vessels were fumigated by the Cuban authorities, under the supervision of the service, and 44 vessels were recommended to be fumigated on arriving at a United States port.

In July and August, 1912, all passengers for the United States were required to present personal certificates of health, which were obtainable by persons in good health, who could prove that they had not lived in an infected zone within six days; 1,377 certificates were issued. In addition to this certificates were issued to 231 persons who passed the period of detention at the Trisconia quarantine station under the direct care of the Cuban authorities. This makes a total of 1,608 passengers under observation on account of possible exposure to bubonic plague.

Of the vessels receiving bills of health, 171 were certified as complying with paragraph 35 of the United States Quarantine Regulations. Later, when the regulations were modified on account of the improved conditions of the port, 205 vessels were reported as taking precautions against the ingress of rats and were so certified on the bills of health.

Seven vessels were reported for neglecting to take precautions against the ingress of rats.

Finally on account of bureau telegrams of May 6 and 10, 1913, passengers from Mexico were subjected to detention, so that they could not reach the United States before the sixth day after leaving the last Mexican port. In May and June, 1913, there were issued to these 225 personal certificates.

In the following table the work of this fiscal year has been compared with that of the preceding year, showing a very decided increase in the year 1912–13, without counting the additional work caused by the plague.

	1911–12	1912–13	Increase.
Bills of health issued	1,186	1,477	291
Vessels inspected (included in above)	986	1,107	121
Members of crews of outgoing vessels inspected	53,617	59,199	5,582
Passengers of outgoing vessels inspected	40,730	43,915	3,185

Bubonic plague.—Passed Asst. Surg. R. H. von Ezdorf arrived in Habana July 9, 1912, with instructions to organize the outgoing quarantine service for the United States and enforce the foreign quarantine regulations of 1910, paragraphs 35 to 40. In order to carry out these instructions the personnel of the office was increased. The following is a list of the employees on duty:

Passed Asst. Surg. R. H. von Ezdorf, Acting Asst. Surg. P. Villoldo and R. Wilson, 1 clerk, 1 chief disinfector, 1 assistant disinfector, 3 sanitary guards, and 1 laborer.

Every facility was given by the Cuban authorities to Passed Asst. Surg. von Ezdorf to familiarize himself with the sanitary conditions regarding the prevalence of the plague in all its details.

The information that follows is taken in great part from the special report dated September 9, 1912, made by Passed Asst. Surg. von Ezdorf, for the period July to September, 1912, giving in detail the transactions of this office on account of the bubonic plague. The statistics relative to this work are taken up in the summary of transactions for the year.

The existence of bubonic plague in Habana was first confirmed on July 6, 1912, in a case of a Spaniard who was taken sick on June 30. After that date 2 more cases developed, 1 confirmed July 9 and the other July 22; these two died. There were therefore 3 cases with 2 deaths from plague known to have occurred between July 6 and

September 1, 1912. An investigation made by the Cuban sanitary authorities showed that there had occurred 1 if not 2 very suspicious cases, also resulting in death, prior to the first case officially confirmed. All the cases were in persons of one neighborhood, the first, however, three blocks distant from the last cases.

The Cuban authorities had suspected the possible existence of plague prior to the occurrence of human cases. The official report of the presence of plague in Porto Rico was received by them on June 20, and on the same day an anonymous communication was received from a resident stating that an unusual mortality among rats had occurred in an area covering three blocks, which were within a square of the Caballeria wharf. Investigation elicited the information that the mortality among rats had been noticed during the preceding two weeks and at that time had ceased. The presence of infection can reasonably be dated as early as the first week of June. Between June 24 and July 8, 291 rats were caught within this infected district, and none was found infected with plague. From July 8 to September 1, 1912, 8,166 rats were autopsied, none of which had plague. Since July 8, 1912, a systematic campaign of rat extermination was in progress until the end of the fiscal year. This extended to the whole of the old city, the wharves and the villages of Casa Blanca and Regla across the bay. The vessels and the lighters in the bay received particular attention. Along with this a general house-cleaning campaign was undertaken and measures to make old buildings rat proof were ordered.

The rapid control of the infection may be attributed to the early discovery and report of the presence of infection and the active measures taken by the sanitary department. It is noteworthy that an old sewer which is very short extends along the known infected blocks, thus limiting the possible refuge or exodus of rats by such a route beyond these blocks.

An area of Habana, which included the old city (bounded by Monserrate and Egido Streets), was declared the infected zone, although it extended very much beyond the known focus of infection. Later, when it was evident that the epidemic had been controlled (August 19), this infected zone was reduced to include only the district between Cuba Street and the water front.

On August 23, 1912, the Cuban department of sanitation advised the secretary of state to inform the representatives of foreign nations that Cuba was free from plague, but that the campaign against rats would be continued.

On August 26 the bureau authorized the removal of all restrictions upon passengers departing for the United States. Hence the individual certification of passengers was discontinued, but an inspection of every passenger was made just prior to departure.

Quarantine measures were continued to prevent rats entering vessels and to kill those already on board.

Beginning on November 15, 1912, on the bills of health issued, the condition of the port was put down as "good," instead of as "suspicious of rat plague," as heretofore.

Finally, Bureau circular letter dated February 15, 1913, removed practically all restrictions, except fumigation of vessels once every four months to kill rats.

PUERTO MEXICO (COATZACOALCOS), MEXICO.

Acting Asst. Surg. George R. Tabor reports as follows: During the fiscal year (from March 28, 1913) 58 vessels were inspected, 10 of which were fumigated. These vessels carried 3,175 crew and 694 passengers.

VERA CRUZ, MEXICO.

Acting Asst. Surg. I. A. Campbell reports (period May 28, 1913, to June 30, 1913):

Vessels inspected	14
Vessels fumigated for mosquitoes	5
Vessels fumigated for rats and mosquitoes	1
Crews inspected	1,163
Passengers inspected	1,513
Health certificates issued	155
Steam vessels	19
Sailing vessels	1
Bills of health issued to United States ships without inspection	2

In comparison with past years the general health of Vera Cruz has been good; the death rate is, however, rather high, being 42.10 per 1,000 on an estimated population of 40,000. From May 28 to July 1, 1913, there were 142 deaths, distributed as follows:

Stomach and intestinal disorders	23	Drowning	2
Malaria	10	Puerperal sepsis	1
Cancer	2	Tetanus	1
Organic heart troubles	10	Pneumonia	7
Tuberculosis	31	Hepatitis	1
Cirrhosis of liver	3	Encephalitis	2
Traumatism	7	Erysipelas	1
Meningitis	2	Appendicitis	1
Stillborn	11	Rheumatism	1
Marasmus	5	Smallpox	4
Alcoholism	6	Hemorrhage	2
Bright's disease	4	Peritonitis	1
Asthma	1		
Whooping cough	1	Total	142
Cerebral hemorrhage	2		

Smallpox is the only quarantinable disease that has been reported from May 28 to the end of the fiscal year. Of this disease there have been 9 cases. Whooping cough is present, but very little attention is paid to it.

Tuberculosis causes about 20 per cent of the deaths, due to the widespread presence of malaria, the damp enervating climate, and poorly nourished condition of a large part of the lower class (among whom it is most prevalent). Moreover, almost no effort is made to combat the disease.

There has been very little sickness among the ship's crew while in this port. Malaria and intestinal disorders are the principal complaints.

All houses are inspected twice per week both for sick people and for open standing water; this last when found is either poured out or oiled. During this season of the year and especially in June and July, as it rains heavily almost every night, there are many pools and puddles, also every crack and crevice capable of holding water is full, making it very difficult to keep down the mosquitoes.

Rats are very numerous and no effort is made to exterminate them.

PROGRESO, MEXICO.

Acting Asst. Surg. W. R. P. Thompson reports as follows: Bills of health and supplemental bills of health were issued for 48 vessels, with 2,544 persons in their crews, 1,845 passengers, 335 of whom were shipped from Progreso.

Two cases of smallpox were notified on May 25, arriving on the Mexican steamer *Sinaloa*. One case of dengue fever reported May 10, 1913.

The health of the port has been satisfactory.

MANZANILLO, MEXICO.

Acting Asst. Surg. Morris Morgenstein reports as follows: For the fiscal year ended June 30, 1913, 41 vessels were inspected, of which number 6 were fumigated. These vessels carried a total of 5,226 passengers and crew.

The estimated population is 1,500 and the death rate for the fiscal year 1913 was about 68 per 1,000 inhabitants, the most common causes of death being malarial fever 22, pernicious malarial fever 2, pneumonia 15, eclampsia 12, scorpion bites 11, dysentery 6, diarrhea 7, wounded 6, tuberculosis 6.

Malarial fevers are endemic, with the milder intermittent types predominant. Simple dysentery is commonly observed, as are also gastro-enteric disorders.

No cases of yellow fever have been reported since 1910.

The only quarantinable disease reported was smallpox, 2 cases of which were found in troops brought from Mexico City.

LA GUAIRA, VENEZUELA.

Acting Asst. Surg. W. J. S. Stewart reports as follows:

The outlook for improved sanitary conditions, not only in Caracas and in its port, the town of La Guaira, and in the nearest western port, Puerto Cabello, which was spoken of in the annual report of this station for the fiscal year 1912, has proved true in every particular. Considerable improvement has taken place not only in the eradication of yellow fever and plague from these three cities, but also in the sanitary measures employed in them all, by which such eradication has taken place.

As regards water-borne diseases—dysentery and typhoid fever—the frequency with which they visit cities will in all probability soon be diminished. When the city of Caracas redetermines to put in a proper and pure water supply (and there is but little engineering difficulty to be overcome), and is prepared to keep such supply uncontaminated, the deaths from dysentery and typhoid fever will be much decreased. The water supply of Caracas is at present subject to contamination and at times carries the cause of these diseases. Furthermore, it is insufficient for all purposes now, and when proper sewerage is placed will be still more insufficient in quantity. The same is true as regards insufficient supply of the La Guaira water supply and also of that of Puerto Cabello, but the quality of both the last-named waters is excellent and free from reasonable risk of contamination.

Mortality statistics of the city of Caracas.—Following is a list of the causes of a majority of the deaths in the city of Caracas during the calendar year 1912 and the first six months of the present year:

	1912	1913 (to July 1).
Typhoid	46	26
Malaria	13	8
Diphtheria	2	1
Grippe	33	6
Dysentery	123	66
Yellow fever	27	0
Tetanus	6	20
Tuberculosis—all kinds	476	248
Diseases of heart and vessels	468	209
Pneumonia	36	16
Hookworm	22	14
Less than 5 years of age	675	352

Total number of deaths during 1912	2,617
Total number of deaths, 1913 to July 1	1,250

Tuberculosis is of course prevalent everywhere, as is dysentery, and to a lesser extent malaria, but the latter is not a great factor in the death rate. During the calendar year 1912 there were in the whole country, excepting certain portions of the State of Amazonas, or, rather, the Territory of that name, 65,729 deaths, with 75,892 births. The statistics are also available for the month of February, 1913, when there were 4,896 deaths and 7,636 births.

Dysentery and malaria, district of Paez, State of Miranda, from October, 1912, to June, 1913.—The district of Paez is part of the State of Miranda, and the statistics given here are for the towns of Rio Chico, San Jose, El Guapo, and Cupire. These are the towns which suffered so severely in the epidemic of dysentery and malarial fevers which occurred last July and which was reported in the last annual report from this station. The epidemic lasted through May, June, and July and was only ended after the Government had taken sanitary management into its own hands. During the outbreak there were reported, up to July 15, 1912, 1,298 cases of dysentery and 1,206 cases of malarial fever; this in localities totaling in all no more than 11,000 persons. The mortality from these diseases was very heavy, that from dysentery being 7.10 per cent and that from malarial fever 2.78 per cent. These towns are all distant about 60 miles from Caracas—Rio Chico being on the coast.

Quarantinable diseases and statistics.—The last cases of yellow fever reported during the fiscal year 1913 in the country were as follows: In Caracas, January, 1913. There was also a case in the Vargas Hospital there in May, 1913, in the person of a resident of Valencia, 100 miles from Caracas, who was taken ill the day after arrival in Caracas from Valencia. This case therefore belongs to the latter-named city. In La Guaira the last case was in the fortnight ended December 30, 1912. In Puerto Cabello there have been no cases during the year. In Ocumare del Tuy, last case January 25, 1913; in La Victoria, December 2, 1912; in Villa de Cura, December 28, 1912; in Petare, last case December 16, 1912; and in Valencia (except the case mentioned above as occurring in Caracas), last case March 7, 1913.

All the localities mentioned have in former years been much afflicted with yellow fever. It is directly due to the work of the national sanitary board that the improvement in these localities has taken place.

Yellow fever in Caracas and La Guaira.

Month.	Caracas.						La Guaira, fiscal year 1913 (all deaths).
	1911		1912		1913		
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	
January	25	16	12	2	2	0	....
February	24	12	9	4	1	0	....
March	15	5	3	3	0	0	....
April	10	5	0	0	0	0	....
May	6	6	4	4	[1] 1	0	....
June	7	7	1	1	0	0	....
July	9	8	8	2	0	0	1
August	17	4	4	3	0	0	2
September	8	6	2	2	....	....	2
October	13	11	6	1	....	....	0
November	17	8	7	0	....	....	2
December	21	19	2	1	....	....	[2] 1
Total	172	107	58	23	4	0	8

[1] Case arrived ill in Caracas from Valencia.
[2] No cases nor deaths since December, 1912.

There has been no case of bubonic plague reported anywhere in the Republic during the year except in the city of Caracas, where the last case occurred in October, 1912. In all, during the fiscal year, there were in Caracas 10 deaths from plague.

Plague in Caracas.

Month.	1910	1911	1912	1913
January	2	0	1	0
February	0	0	1	0
March	1	12	1	0
April	0	10	1	0
May	1	9	0	0
June	1	6	2	0
July	5	3	3	0
August	4	6	1	0
September	1	0	0	....
October	20	9	1	....
November	4	1	0	....
December	0	0	0	....
Total	39	56	10	0

The above statistical tables are absolutely official and are prepared from figures supplied at different times by the national sanitary board. In the face of these figures it is only justice to state that both the ports of La Guaira and Puerto Cabello are clean from any quarantinable disease at this date. No other locality than Caracas is given for plague statistics because in the past three years no cases have occurred anywhere in the Republic except in the capital.

From official reports the last case of bubonic plague in La Guaira occurred in April, 1908, and the last cases (never proven, but suspicious) in Puerto Cabello in February, 1910. Since that date the old wharf at the latter port has been entirely renewed and rendered somewhat more rat proof than formerly, but still it is in anything but the proper condition from a rat-proof point of view. It is to be repaired again soon and will probably be in a more sanitary condition. The pier in La Guaira is, as has been often reported, as rat proof as possible.

The same sanitary conditions (as regards freedom from quarantinable disease) existing in La Guaira and in Puerto Cabello do not obtain in the port of Maracaibo. Advices from the consul there and from medical men point to the fact that yellow fever is endemic. Cases occur from time to time, chiefly among newly arrived foreigners, but not to any extent among the natives. This is in all probability due to the fact that most Venezuelans have had the disease in childhood and are immune. A few cases have occurred in past years at Cumana to the eastward, but not many, according to information received from interested persons.

Leprosy is existent throughout the country. Cases are seen along the railroad towns and in the streets of the larger cities to a gradually decreasing extent. Most lepers of the lower class, i. e., peons, are gathered in the leper station at or near Maracaibo, which had over 650 cases in July, 1913.

Summary of transactions for the year.

Vessels inspected	137
Crews	12,128
Passengers inspected (San Juan and Colon)	688
Pieces of luggage inspected (San Juan and Colon)	540
Passengers in transit	7,998
Vessels fumigated at Puerto Cabello	24

GUAYAQUIL, ECUADOR.

Passed Asst. Surg. Herman B. Parker reports as follows:

Maritime quarantine.—Bills of health were issued to 80 vessels during the fiscal year.

The following is a summary of the quarantine transactions for the year:

Bills of health issued	80
Vessels fumigated (sulphur)	77
Vessels inspected and passed	3
Crew inspected	5,995
Cabin passengers inspected	1,333
Steerage passengers inspected	682
Baggage fumigated (pieces)	2,810
Baggage inspected and passed (pieces)	1,667
Certificates for cargo issued	82

No changes were made in the regulations of the previous year. An inspection of the water front shows that the anchorage in continuous use since the establishment of the station is free from the danger of stegomyia infection. However, since the middle of June a change was necessary on account of a decree issued by the President of Ecuador requiring all vessels to anchor within the infected area of the city. This will necessitate a complete fumigation of all vessels bound for the Canal Zone prior to sailing. The vessels load and discharge in front of the city and when ready to be dispatched anchor off the matadero, where the vessel is fumigated. This order has caused the steamship companies to withdraw their better vessels from the service.

The inspection of the passengers at the service office still continues, with the result that no case of yellow fever or plague has been reported at ports of destination for the year. This inspection is necessary to prevent the ships from becoming infected by those already sick or others coming from houses where disease is known to exist.

Yellow fever.—This disease has prevailed throughout the year in Guayaquil and along the line of the railroad to Bucay. In Milagro and Naranjito the disease has existed almost constantly, so that it may be said that these towns are equally as dangerous as Guayaquil. The Government of Ecuador has voted about $20,000 for the establishment of a hospital in Milagro for the care of yellow fever and plague, and it is now in the course of construction.

Owing to the screening of the hotels the number of cases of this disease among the foreign population has been considerably less than in former years.

Appended is a table of the cases during the fiscal year as reported by the director of health.

Plague.—This disease as usual had its recrudescence at the end of the dry season, but was not so virulent; neither were there as many cases as in former years. The disease again made its appearance along the line of the railroad, this year reaching as far as Alausi, which has an altitude of about 6,000 feet. This disease is gradually becoming acclimated to the altitudes, and when it appears in epidemic form in the higher altitudes will probably be of the pneumonic as well as the bubonic type, with a much greater mortality than at present. In the cities of Riobomba and Quito rodents and fleas abound.

Appended is a table showing the disease as reported by the director of health.

Typhoid fever.—This disease has prevailed extensively throughout the year and is of the same severe type noted on the northern continent. This disease is probably transmitted by contamination of the water supply in its distribution in the city as well as by contact. It is not believed that the city water at its source is contaminated.

Malarial fevers.—Malarial fevers prevail extensively throughout the rainy season, the quotidian type predominating, though many tertian cases are seen.

Poliomyelitis.—This disease seems to be increasing in Ecuador. During the fiscal year three fatal cases came under observation.

Smallpox.—This disease was not reported in Guayaquil or vicinity during the fiscal year.

Permanent sanitary improvements.—No permanent sanitary improvements were effected during the year. There is, however, a widely growing sentiment in favor of letting a contract for the complete sanitation of the city. The financial condition of the country is good enough to insure the success of this work, but owing to obligations of former administrations it is difficult to secure bids at the present time. It is hoped, however, that the agitation which will lead to the sanitation of Guayaquil and surrounding towns will continue.

Yellow fever and plague in Guayaquil during the fiscal year ended June 30, 1913.

Month.	Yellow fever.					Plague.				
	Previously existing.	New cases.	Cured.	Died.	Remaining.	Previously existing.	New cases.	Cured.	Died.	Remaining.
July	6	10	5	6	5	0	0	0	0	0
August	2	3	3	2	0	2	19	6	8	7
September	0	4	0	4	0	16	40	15	15	26
October	1	8	1	7	1	37	77	25	26	63
November	1	12	5	6	2	89	133	60	52	110
December	2	13	0	10	5	115	115	80	54	96
January	12	56	17	30	21	77	68	49	42	54
February	17	34	24	18	9	40	49	31	18	40
March	7	26	14	16	3	41	22	28	9	26
April	1	34	12	15	8	5	6	8	2	1
May	8	22	6	14	10	1	7	5	2	1
June	10	20	7	12	11	1	4	2	1	2
Total	....	242	94	140	....	....	540	309	229	....

CALLAO, PERU.

Acting Asst. Surg. J. L. Castro-Gutierrez reports as follows:

During the fiscal year 1912, 182 vessels were dispatched, of which 160 were fumigated before sailing and 22 inspected and passed; 13,059 members of the crews, 6,484 cabin passengers, and 2,643 of the steerage class were inspected (2,034 certificates of health having been granted to the latter); 337 persons were vaccinated, as they came from localities infected with smallpox; 2,531 pieces of baggage of the steerage passengers were disinfected and 185 inspected and passed; 54 permissions were granted to embark unsuspected cargo on deck; 4,551 kilos of dry skins were inspected and certified; 13 shipping certificates for different objects were issued.

The work performed in the fiscal year 1912 compared with that of 1911 is as follows:

	1911	1912
Vessels fumigated	169	160
Vessels passed	18	22
Total personnel inspected	21,878	22,186

The decrease in number of vessels fumigated in 1912 as compared with 1911 is caused by the unsettled condition of business. Conditions are improving.

Plague in Peru.—The official statistics of the plague in Peru show 906 cases occurring in 1912, of which 387 recovered, 475 died, 12 results unknown, and 58 patients remaining for 1913. The record of plague in Peru during previous years is as follows: One thousand six hundred and ninety-one cases in 1908; 999 in 1909; 706 in 1910; 879 in 1911; 906 in 1912. Since 1909 the number of cases has increased, and every year the number of infected localities in the same infected departments increases.

The statistics at Callao are as follows: Twelve cases in 1910; 27 in 1911; 43 in 1912.

Smallpox.—A small epidemic of smallpox occurred last year at Lima and Callao. The statistics show that every five years there appears at Lima an epidemic of smallpox. Preventive vaccination was effective where practiced and reduced the number of cases.

Other infections.—Dengue appeared for the first time since 1878. No other infections were reported.

Cases of scabies occurred in all the towns of this coast, many of which were complicated with nephritis.

Sanitary works.—Sewerage has been provided in Callao, and other similar improvements are contemplated.

HONGKONG, CHINA.

Surg. B. W. Brown reports as follows:

Bills of health were issued to 430 vessels, carrying 11,322 cabin passengers, 25,969 steerage, and 43,192 crew; 13,432 steerage and 23,308 members of crew were bathed and 34,370 pieces of baggage were disinfected; 151 vessels were fumigated with sulphur and 1,236 rats killed. The crews' quarters on 279 vessels were disinfected with either formaldehyde or bichloride of mercury. The following list of cargo was either stored or disinfected:

	Disinfected.	Stored.
Human hair....cases..	3,719	7
Bristles....do....	721	25
Hides....pieces..	10,317	....
Old rubber....bales..	336	....
Feathers....do....	....	1,080
Bone-meal....bags..	....	47,077
Old embroideries....cases..	4	....

The rat reports from the colonial government give a total of 86,499 rats caught during the fiscal year, and of this number 203 were infected. The following communicable diseases were reported during the fiscal year:

	Cases.	Deaths.
Bubonic plague	338	286
Smallpox	122	70
Enteric fever	134	55
Diphtheria	98	36
Asiatic cholera	5	1
Puerperal fever	27	19
Scarlet fever	9	2

The plague epidemic of last year, which was quite a large one, rapidly decreased in July. Two or three cases occurred in August, and the last case was reported September 14.

The 1913 epidemic, which has been a very small one, commenced in January, and so far only 192 cases with 163 deaths have been reported. No Europeans developed the disease and no pneumonic cases occurred. Four Filipino steerage passengers, removed from the Pacific Mail steamers with suspicious symptoms, were diagnosed later in the hospital as cases of plague, but no new cases developed on these vessels.

There were 122 cases, with 70 deaths, of smallpox. These cases were scattered throughout the year, and at no time reached epidemic proportions.

SHANGHAI, CHINA.

Acting Asst. Surg. S. A. Ransom reports as follows:

Transactions.

Vessels spoken and passed	15
Steamers inspected and passed	149
Steamers disinfected	11
Sailing vessels inspected and passed	2
Sailing vessels disinfected	2
Crew on steamers	23, 619
Crew on sailing vessels	33
Passengers on steamers	16, 781
Passengers on sailing vessels	0
Bills of health issued	108
Persons bathed	923
Pieces baggage disinfected	924
Pieces of freight viséed	659, 041
Pieces freight disinfected	8, 564
Vaccinations certified	576

Vessels bound to American and Philippine ports are required to remain in the stream while in this port, and loading is done from lighters (which have been fumigated from time to time to kill rats) and as far as possible in daylight. Rat guards are required to be attached to lines between the lighters and the vessel.

Cargo of all description is subjected to supervision before being loaded on vessels bound to the United States, it being required that all boat notes or shipping orders be submitted for countersignature before the lighter companies will accept the goods.

No cases of quarantinable disease were discovered on board vessels bound to the United States during the year, but there were investigated 32 cases of illness among the personnel of such vessels. On the British steamship *Kansas*, bound Yokohama to New York, 5 cases of beriberi were found, and recommendations made to the master for dealing with the outbreak.

During the period January 1 to June 30, 1913, there were reported within this settlement a total of 81 deaths among foreigners and 4,054 deaths among natives. The quarantinable diseases reported present during the same period were smallpox, 31 cases among foreigners, and 205 deaths among natives, and bubonic plague 8 cases, of which 7 were fatal. The population of the international settlement is estimated at 14,250 foreigners and 610,000 natives.

YOKOHAMA, JAPAN.

Acting Asst. Surg. Whiting S. Warden reports as follows:

Transactions.

Steamships inspected and granted bills of health	290
Sailing ships inspected and granted bills of health	12
United States warships	4
Japanese training ship	1
Total number bills of health granted	307

Number of vessels fumigated	62
Passengers carried in vessels above:	
Saloon	8,469
Second-class passengers	3,023
Steerage passengers	40,033
Crews	42,906
Passengers certified by this office	4,440
Persons required to bathe and undergo special inspection	3,216
Crews bathed	843
Pieces of baggage disinfected under supervision of the service	7,558
Cases and boxes of human hair inspected	446
Cases and bales of animal skins inspected	78
Bales and bags of feathers inspected	172

The inspections of the steerage passengers and Asiatic members of the crews were invariably performed. Inspections of the officers and second-class passengers were made, if in the judgment of the inspecting officer there was need, and also of the saloon passengers, if in the judgment of the inspector it was necessary.

On incoming vessels to this port the following cases of quarantinable diseases were noted:

On the arrival of the Japanese steamship *Ezan Maru* at Moji from Hongkong July 22, 1912, she was detained for disinfection and a rat hunt. During this vessel's last voyage from Miike, Japan, to Hongkong, when a cargo of coal was carried, 42 dead rats were found on board. Three of the crew contracted plague on the voyage, and the vessel was disinfected at Hongkong.

At Hongkong a Filipino steerage passenger removed from the steamship *Manchuria* developed plague. The *Manchuria* was due to arrive at Yokohama July 27, 1912. News of this case of plague was received by telegram from Hongkong on July 18, 1912, and a wireless message was sent to the *Manchuria*, then en route from Kobe, to go direct to the quarantine station at Nagahama, where the usual disinfection methods were carried out, and she sailed from Yokohama for San Francisco July 29, 1912.

Smallpox.—One case of smallpox in a fireman on the Pacific & Oriental steamship *Pera*, which arrived at Yokohama January 1, 1913. The patient was removed to the quarantine station at Nagahama.

In Yokohama, during the year ended December, 1912, the following cases of contagious diseases were reported:

	Cases.	Deaths.		Cases.	Deaths.
Typhoid fever	257	49	Typhus fever	0	....
Diphtheria	129	29	Paratyphoid fever	16	3
Dysentery	75	14	Cholera	44	39
Scarlet fever	20	3			
Smallpox	0	....	Total	541	137
Plague	0	....			

The contagious diseases reported from January 1, 1913, to May 31, 1913, are as follows:

	Under treatment.	New cases.	Deaths.
Typhoid fever	25	50	17
Diphtheria	3	148	53
Dysentery	0	17	1
Scarlet fever	7	12	4
Smallpox	0	1	0
Paratyphoid fever	0	0	0
Relapsing fever	0	13	0
Cholera	0	3	3
Total	35	244	78

Rats.—The Yokohama city health department bought during the year ended December 31, 1912, 258,592 rats, which were examined and destroyed. For these rats the sum of 9,451.26 yen was expended. A sum of 2,136.10 yen was also expended for the purpose of encouraging the breeding of cats. No rat infected with plague was found.

Vaccination.—During the year 1912 there were 17,363 vaccinations made by Government officers, of which 9,224 were successful, 7,916 unsuccessful, and 223 with results unknown; 465 vaccinations were made by private practitioners, of which the results were 445 successful and 20 unsuccessful.

Typhoid fever.—There were 257 cases of typhoid fever during the year ended December 31, 1912, with a death rate of 19.06, somewhat less than the death rate of the year 1911, which was 19.60. Typhoid fever seems to be constantly present in Yokohama, and specially prevalent during the months of August, September, and October, when the number of cases for these three months was 156 cases, or more than one-half of all the cases for the year.

Paratyphoid fever.—Sixteen cases have been reported during the year 1912, with 3 deaths. Death rate, 18.75.

Dysentery.—Seventy-five cases were reported during the year 1912, showing 15 cases more than the year 1911. Death rate, 18.76, against death rate of 16.66 for the year 1911.

Diphtheria.—One hundred and twenty-nine cases of diphtheria were reported during the year 1912, 24 cases less than in the year 1911, with death rate of 22.48 against death rate of 30.71 for 1911.

Scarlet fever.—Twenty cases were reported during the year 1912, which shows a decrease of 57 cases reported in year 1911; death rate, 22.72.

Smallpox.—There was no case of smallpox reported in Yokohama during the year 1912. Vaccination was regularly enforced by order of the city health office throughout the year, and particularly from April 4 to April 10 and November 1 to 30, 1912.

Plague.—No case of plague has been reported in Yokohama for the year 1912. The last infected rat reported in Yokohama was in the year 1909.

Trachoma.—The number of school children inspected for trachoma during 1912 was males, 26,455, and females, 25,526. Among those examined 1,609 males and 1,482 females were found to be suffering from trachoma, and 19 cases were very severe.

All vessels bound for the United States and possessions were inspected as near to the hour of sailing as practical. The vessels that were empty were fumigated by sulphur burned in the presence of water in all the holds, storerooms, and forecastles, according to the regulations. Many rats and bugs were destroyed.

The procedure of the inspection of steerage passengers has been changed by an order from the bureau dated February 17, 1913, that the bathing and disinfection of the baggage of steerage passengers bound for the United States would not be required, so that from the reception of this order the steerage passengers bound for the United States have not been bathed and their baggage has not been fumigated. The steerage passengers bound for Manila on vessels going direct, i. e., not calling at Hongkong, have been bathed and their effects disinfected, according to instructions from chief quarantine officer of the Philippine Islands Surg. Heiser.

Boat notes for all cargo to be shipped to the United States as well as the invoices and cargo manifests have been viséed.

Cholera in Japan.—Cholera was reported to be raging violently in the Miyako Islands in July, 1912, and a dispatch from Naha, Loochoo Islands, reported that on the Miyako Islands, lying between Loochoo and Formosa, there were 81 cases on July 10, and later that nearly half the inhabitants were affected. Three cases of cholera were reported at Kyoto, Japan, on August 10 (not official), and a case of cholera was found on board a vessel of the Russian volunteer fleet, the steamship *Pensa,* on August 10, and a second case on the same steamer on August 13. A case of genuine Asiatic cholera was reported from Moji, officially, by the governor of the Fukuoka-ken, Japan. The Nippon Yusen Kaisha's steamship *Yokohama Maru* sailed from Shanghai on August 18, and on arrival at Moji on August 25 a Japanese cabin passenger was found to be sick of Asiatic cholera. The governor of Nagasaki reported that on August 1 the steamship *Otaru Maru* arrived at Nagasaki, and one of the ship's cooks was found to be suffering from cholera. A second case of cholera, a European cabin passenger, occurred on the *Yokohama Maru* on August 21.

Cholera cases were found on the Japanese steamship *Mexico Maru* at Moji, the steamship *Seiun Maru* at Nagasaki, the steamships *Nitssho Maru* and *Kobe Maru* at Dairen (Dalny), all these vessels having sailed from Shanghai about the last of August.

Early in September quarantine was declared against Shanghai as the seat or origin of the cholera, and a strict inspection of vessels from Shanghai was made. The number of vessels coming to Yokohama from Shanghai is about 20 a month. Extra precautions were taken against the introduction of cholera into Yokohama, and quarantine was declared against Moji.

The funeral rites of His Imperial Majesty Mutsuhito, the late Emperor of Japan, were celebrated on September 13. As the obsequies attracted to Tokyo large numbers from all over Japan, Chosen, and China, they served as a means of spreading the cholera from the foci already established in Fukuoka and Yamaguchi kens. Cholera appeared in Yokohama on September 20 and in Tokyo on September 27.

On account of the rapidity of the spread of cholera from the south of Japan to Kobe, Osaka, and Tokyo during the last part of

September, intending second cabin and steerage passengers for the United States were kept under observation in Yokohama for a period of 10 days. The length of time of observation of intending passengers, second cabin and steerage, from infected localities was changed from ten to five days on October 5th. This observation of passengers from infected localities by daily inspection was continued until the epidemic of cholera was officially declared at an end.

The following account of the epidemic of cholera was written by Senior Surg. Fairfax Irwin, Yokohama, September 30, 1912:

THE EPIDEMIC OF CHOLERA IN JAPAN.

Some observations on this subject at this time may not be without interest. The outbreak of the disease in the capital by its very suddenness and territory covered has served to demand instant attention of the sanitary authorities, before rather inclined to look on the outbreak in other parts of the Empire as the usual cholera epidemic of small foci of the disease confined to a few ports, appearing in August and disappearing with the advent of cold weather. That the spread of the disease and the number of cases is more serious is attested by its sudden appearance in Tokyo, there having been 19 cases since the 24th instant, and these cases located in widely separated districts of the city, some of these being in Chiba across the bay. Many of these cases appeared simultaneously, and it does not seem to be known when the first case actually occurred. It is thought possible that *carriers* may have brought the disease to the city at the time of the Emperor's funeral, where about all the conditions for the spread of an epidemic were present. It is reported that the Government medical experts believe that the disease was imported very recently. Judging from the fact that many of the places where cases have occurred have no direct communication with each other, it may be said that food or drink was probably the means of the spread of the epidemic in Tokyo. If this was the case the articles in all probability were brought in from outside of the city, possibly fish or vegetables. It hardly seems possible that the water supply was infected in the first place; but it must be remembered that many wells are still used in Tokyo-fu. According to investigations, most cases of cholera in the city and suburbs were caused by eating raw fish in *sushi*, a kind of rice ball treated with vinegar; further it was found that the fish came from western ports which are said to be cholera infected. My opinion is that the epidemic was in all probability started by carriers of the bacillus coming from Shanghai. The quarantine inspection of Japan is strict enough ordinarily, but many vessels arrived at Nagasaki and Moji from Shanghai with cholera aboard, and although the usual detention of five days was enforced on all such vessels and thorough disinfection carried out, the carriers may have been many, and in that case account for the rapid spread from many different foci. A late dispatch from Shanghai states, that while there are no new cases among foreigners, 220 Chinese died from cholera during the week. The epidemic in Japan can thus be fed indefinitely from its source.

Again, under date of October 6, Senior Surg. Fairfax Irwin wrote:

In Yokohama 14 cases have occurred, but so far only 4 have been certified. The officials at Yokohama are greatly puzzled, it is stated, as to the manner in which cholera was introduced into the port. The harbor sanitary authorities are positive that no suspicious cases passed through their hands, and the police of the municipality are equally certain that no violations of sanitary regulations have occurred on land. The usual precautions are being taken at this port. A special circular has been issued to the steamship companies and passenger agencies, embodying the requirements of the American public health regulations briefly. All steerage and second-class passengers from infected districts are being held five days under observation, their persons bathed and baggage steamed. Steerage passengers on vessels in transit are prohibited from coming ashore. Raw foodstuffs are not permitted to be carried on ships. Medical officers of ships are requested to report the sanitary history of their vessels. Finally, a most careful supervision is kept of articles shipped by freight; human hair, hides, feathers, and old clothing must be disinfected, and all foodstuffs, must be provided with certificates of origin.

This epidemic of cholera has been characterized by two distinct periods, one following the obsequies of the late Emperor in September, and a distinct recrudescence after the review of the Imperial

Japanese Navy in Tokyo Bay in November. It continued during the winter, defying the cold weather, and not disappearing finally until about the middle of March, 1913.

Measles in Yokohama.—Measles have prevailed in Yokohama, and have been unusually severe. No statistics are furnished by the authorities, as it is not a reportable disease here.

Relapsing fever.—Thirteen cases in Tokyo in April, 1913, and a few cases in Yokohama were reported.

Plague in Formosa.—Sixteen cases of plague with 13 deaths were reported in the district of Kagi, Formosa, in April, 1913.

Poliomyelitis.—This disease is not reported to the authorities and there are no statistics.

Tuberculosis is very prevalent in Japan.

Leprosy is always present. Precautions have been taken against the spread of this disease, and hospitals have been established for lepers.

The population of Yokohama according to the census of December 31, 1912, is 455,241. Registered births during the year 1912—males 4,713, females 4,529, making a total of 9,242. The deaths were 6,135. Death rate 13.47, as compared with 15.22 for last year.

Trachoma.—Among 433,674 conscripts examined 104,067 were found to be suffering from trachoma. Rate 239.96 in 1,000.

Venereal diseases.—Among the conscripts examined 1,840 were found suffering from syphilis, 2,232 from soft chancre, and 6,834 from gonorrhea. Rate 25.33 in 1,000.

Typhoid fever at Yokosuka.—Yokosuka, one of the largest naval stations in the Empire of Japan, about 20 miles from Yokohama by rail and 5 miles from Yokohama across the bay, suffered from an epidemic of typhoid fever in July and August, 1912. About 400 cases were reported. Another epidemic occurred at Yokosuka in January, 1913, especially among the officers and men of the fleet of the imperial navy.

Meningitis.—There was an epidemic of meningitis, probably cerebrospinal fever in Okayama-ken during September, 1912. About 350 cases were reported.

Hookworm.—Strict examination is made by the Japanese authorities for hookworm in intending passengers for the United States, and certificates are given by the official Japanese inspector to Japanese emigrants for the United States that they are free from hookworm and trachoma.

The personnel of the office changed on February 6, 1913, when Senior Surg. Fairfax Irwin left Yokohama to take charge of the marine hospital, Chelsea, Mass., and Acting Asst. Surg. Worden was left in charge.

KOBE, JAPAN.

Acting Asst. Surg. Garland P. Moore reports in part as follows on the transactions at this station during the fiscal year ending June 30, 1913:

Steam vessels inspected and granted bills of health	278
Sailing vessels inspected and granted bills of health	1
Total bills of health granted	279
Passengers on the above vessels inspected	41, 518
Crew on the above vessels inspected	38, 961

Pieces of baggage disinfected	5,621
Number of persons bathed, disinfected, and their effects disinfected	4,986
Vessels fumigated	36
Pieces of freight inspected and disinfected	792

Manifests viséed for 204,957 tons of cargo.

Consular bills of health were issued to 279 vessels, of which 34 were original and 245 were supplemental.

The crews and passengers of all these ships were inspected at the time of their departure. Thirteen cases of infectious diseases were discovered on ships in this harbor, to wit: Typhoid fever, 2 cases; dysentery, 2 cases; cholera, 3 cases; measles, 1 case; leprosy, 5 cases.

Thirty-six ships were disinfected with sulphur dioxide gas for the destruction of rats.

Every precaution was taken to prevent the access of rats to ships, rat guards being used on lines to lighters when loading and discharging cargo, and all lighters used to convey cargo to ships were subjected to frequent deratization by sulphur fumigation. All cargo of a character likely to attract rats or afford a nesting place for them, such as peanuts and grain, was required to be stowed in rat-proof godowns and packed in new bags before shipment.

Inspection and supervision of cargo godowns were made with a view of eliminating rats. Shipping orders, or boat notes, for cargo destined to the United States were required to be submitted for approval and signature before loading, and no cargo was allowed alongside of ships in lighters that did not bear a certificate of fumigation. All manifests were viséed after loading. In this way a complete check is kept of every item of cargo leaving Kobe for United States ports.

A case of cholera occurred on the 18th of August on the steamship *Yokohama Maru*, en route from Hongkong to Seattle via Japan ports. The case was discovered in a first-cabin passenger, who was removed at Moji. The ship then proceeded to Kobe, a few hours distant, where she was placed in quarantine for five full days, fumigated with sulphur dioxide gas, the passengers and crew bathed, and their effects disinfected with steam. All stores were removed, and the storerooms were washed with mercuric chloride solution. The compartments for passengers and crew and the decks were washed down and sprayed with solution of carbolic acid. The water tanks were emptied and disinfected. No further cases occurred on board.

The steamship *Mexico Maru*, en route from Hongkong to Tacoma, also arrived at Moji a week later, with two cases of cholera and three suspects on board. The ship was brought to Kobe, detained in quarantine, and the necessary precaution taken under the supervision of the United States Public Health Service.

Disinfection of feathers, rags, old rubber, skins, hides, human hair, and personal effects with a doubtful sanitary history was done.

Sanitary conditions, city of Kobe.—The population of Kobe, according to the census taken at June 30, 1913, was 451,010. The registered births were: Male, 5,058, and female, 4,843, making a total of 9,901. The birth rate for 1912, based on the new census figures, was 22.95 per 1,000, while the death rate showed only 2.03 per 1,000.

The sanitary condition of the city during the past fiscal year remained about the same as the preceding year. Cholera made its appearance in August and continued until December 17, 1912. A total of 24 cases occurred, with 13 deaths.

During the presence of cholera in Kobe there was a rigid adherence to the quarantine regulations. All steerage and second-cabin passengers were isolated and kept under observation for five full days before they were permitted to embark. The steerage passengers were bathed, and the baggage of both second-class and steerage passengers was steamed. No fruits and foodstuffs were allowed to be taken on ships destined for the United States. Communication between ships and the shore was kept at a minimum. All cargo with a suspicious sanitary history was disinfected before shipment.

The official report of communicable diseases which appeared in Kobe during the past fiscal year ending June 30, 1913, are given as follows:

	Cases.	Deaths.
Smallpox	1	0
Cholera	24	13
Scarlet fever	27	4
Diphtheria	225	75
Dysentery	267	75
Typhoid fever	354	83
Total	898	250

Sanitary conditions, Empire of Japan.—An epidemic of cholera existed almost throughout all of Japan from August, 1912, to the following March. It appeared almost simultaneously over widely separated districts. During the outbreak 2,720 cases and 1,683 deaths occurred, the death rate being 61.86.

It is interesting to note the number of bacillus carriers found, which reached 586.

Plague: No cases of plague were reported during the year.

Smallpox: There were 14 cases of smallpox, with 1 death.

Dysentery: The number of cases of dysentery was largely increased over last year, there being 26,667, with 5,721 deaths.

Leprosy: It is widespread, and little effort is made toward segregation of lepers.

Diphtheria: Nineteen thousand two hundred and fifty-one cases and 4,761 deaths were reported.

Scarlet fever: There were reported 1,207 cases, with 146 deaths.

Tuberculosis: No definite data of the number of cases of tuberculosis is obtainable. It is undoubtedly on the increase and exists to an alarming extent.

About 70 per cent of persons who were examined for hookworm and about 40 per cent of those examined for trachoma were found to be infected.

City of Osaka.—The official returns of infectious diseases which appeared in the city during the past fiscal year ending June 30, 1913, are given as follows:

	Cases.	Deaths.
Cholera	115	73
Dysentery	351	78
Diphtheria	546	165
Scarlet fever	58	5
Typhoid fever	934	264
Paratyphoid	117	35
Total	2,121	620

LIBAU, RUSSIA.

Owing to the prevalence and spread of Asiatic cholera in Russia and the danger of the importation of this disease through immigrants arriving in the United States, a medical officer of the service, Acting Asst. Surg. C. M. De Forest, was assigned to duty in the office of the American consul at Libau, Russia, on September 26, 1908.

Transactions.—The transactions for the fiscal year ended June 30, 1913, are as follows:

Bills of health issued	28
Vessels inspected and passed	28
Vessels fumigated with sulphur	4
Crews inspected and passed	4, 272
Passengers examined at first inspection	40, 423
Passengers sailed (examined second inspection)	37, 916
First cabin	221
Second cabin	5, 064
Steerage	32, 631
Baggage inspected for foodstuffs	32, 676
Baggage disinfected by formaldehyde gas	6, 175

Comparison of transactions in former years.

Year.	Inspected.	Embarked.	Crews examined.	Baggage.	
				Inspected.	Disinfected.
1908–9	14, 790	11, 716	1, 623		2, 868
1909–10	20, 971	17, 996	2, 470		4, 643
1910–11	22, 047	20, 001	2, 848	10. 337	5. 146
1911–12	28, 325	25, 347	3, 166	23, 309	5, 132
1912–13	40, 423	37, 916	4, 272	32, 676	6, 175

The difference between those examined and those embarked is the number detained because of illness (trachoma, etc.) and because of passport regulations. The number for 1912–13 was 2,507. The actual number detained because of trachoma, suspects, favus, etc., was 2,430, but many of those were treated in Libau and cured and eventually sailed.

Only 9 cases of cholera occurred in the Russian Empire during the fiscal year. On this account the five-days' quarantine and detention of passengers was not enforced. The cases of cholera referred to occurred in Odessa and in the Government of Astrachan.

In accordance with official orders of August 16, 1912, passengers coming from cholera-infected places are at once announced to the Libau police by the steamship company, taken to separate houses, detained five days under the supervision of the Libau sanitary officials, and are declared free from infection before being allowed to sail. All cases of dysentery or persistent diarrhea must be at once reported to the sanitary police.

Plague.—Plague was present at various times during the year in the Government of Astrachan, the last case having been reported on June 23, 1913. In all there were 89 cases with 70 deaths.

Rats.—Every effort has been made to reduce the number of rats to a minimum on those vessels over which the service exercises control. Rat guards are required while lying in port at Libau and each of the steamers have been fumigated with sulphur at least once during the fiscal year. The warehouses and places where goods are stored for the ships have been made rat proof by the liberal use of fine wire mesh and they are periodically fumigated (every three months) by sulphur.

Leprosy.—Leprosy at present is to be found in all parts of the Empire.

The following are the diseases that occurred in Libau during the fiscal year June 15, 1912, to June 15, 1913:

	Cases.	Deaths.
Smallpox	9	0
Scarletina	457	62
Diphtheria	177	27
Typhoid fever	108	10
Typhus fever	14	2
Dysentery	3	0
Anthrax	4	3
Measles	244	1

NAPLES, ITALY.

Surg. D. E. Robinson reports as follows for the fiscal year ending June 30, 1913:

Transactions at Naples, Italy.

Months.	Ships.	Emigrants.		Baggage.	
		Inspected.	Embarked.	Inspected.	Disinfected.
1912.					
July	18	11,199	10,383	1,885	15,010
August	21	11,113	10,398	1,845	14,300
September	19	12,803	11,996	1,965	16,710
October	26	17,460	16,347	3,310	22,140
November	22	9,281	8,575	2,180	11,710
December	20	5,022	4,659	1,090	5,980
1913.					
January	16	4,542	4,218	770	5,370
February	21	11,447	10,972	1,380	14,960
March	29	23,656	22,591	2,200	30,270
April	31	24,744	23,567	2,110	30,250
May	32	29,733	27,952	2,820	36,730
June	24	17,407	16,531	1,925	21,120
Total	279	178,407	168,189	23,480	224,550

Rejections recommended.

Months.	Trachoma.	Favus.	Suspected trachoma.	Suspected favus.	Measles.	Smallpox.	Other causes.	Total.
1912.								
July	430	24	269		1		92	816
August	365	15	218	1		2	114	715
September	450	17	231			1	108	807
October	668	35	289				121	1,113
November	404	38	194				70	706
December	225	14	107				17	363
1913.								
January	180	10	101				33	324
February	244	12	134				85	475
March	608	21	260	1	1		174	1,065
April	622	27	316			1	211	1,177
May	879	35	582				285	1,781
June	376	15	270	1			214	876
Total	5,451	263	2,971	3	2	4	1,524	10,218

Comparison with last two years.

Year.	Emigrants.		Baggage.		Rejections recommended.
	Inspected.	Embarked.	Disinfected.	Passed.	
1910–11	137,879	131,640	173,519	19,565	6,239
1911–12	120,276	116,181	165,329	15,677	4,095
1912–13	178,407	168,189	224,550	23,480	10,218

The above figures show a large increase over the fiscal year 1911–12. Several factors contributed to this increase, one of the most important of which was the better health conditions obtaining in Italy and the consequent removal of the quarantine restrictions which were in force the previous year. Another factor of considerable influence was the cessation of hostilities between Italy and Turkey. The fear of legislation in the United States unfavorable to immigration may also have had a determinating influence.

The number of Italians returning to Italy from ports in the United States during the calendar year 1912 was 87,059 as compared with 125,502 for the calendar year 1911.

Although a recrudescence of cholera throughout Italy was feared for the summer of 1912 this, happily, did not occur, the mainland of Italy and the island of Sicily remaining free from the disease the entire year. The island of Sardinia, however, was not so fortunate, cholera reappearing in the town of Cagliari on August 14, 1912, after an absence of 10 months, the island having been officially declared free from the infection on October 12, 1911.

In consequence of the energetic suppressive measures promptly instituted and efficiently carried out by the Italian sanitary authorities the disease was prevented from spreading to the mainland nor did it at any time reach epidemic proportions on the island itself.

On October 30, 1912, the outbreak was officially declared to be at an end, 61 cases and 20 deaths having been reported from August 14, 1912, to October 19, 1912.

Owing to the severe epidemic of cholera in Turkey during the war with the Balkan States, passengers arriving in Naples from the Levant were permitted to embark for ports in the United States only under quarantine restrictions, which restrictions are still in force.

Transactions of the service at the ports of Messina and Palermo for the months of July, August, September, and October, 1912.

MESSINA.

Months.	Ships.	Emigrants.		Baggage.		Rejections recommended.				
		Inspected.	Embarked.	Inspected.	Disinfected.	Trachoma.	Favus.	Suspected trachoma.	Other causes.	Total.
July	4	432	386	87	453	28	2	11	5	46
August	3	352	303	447	341	30	....	15	4	49
September	3	448	377	326	466	42	....	13	16	71
October	5	440	372	703	570	42	2	12	12	68
Total	15	1,672	1,438	1,563	1,830	142	4	51	37	234
PALERMO.										
July	18	4,134	3,851	4,190	2,940	119	....	109	55	283
August	13	5,178	4,803	4,190	2,895	132	....	199	44	375
September	14	5,193	4,789	4,130	3,800	155	....	191	58	404
October	21	6,488	6,081	4,460	4,620	167	....	172	68	407
Total	66	20,993	19,524	16,970	14,255	573	....	671	225	1,469

MEDICAL INSPECTION OF IMMIGRANTS.

In accordance with the immigration act of February 20, 1907, the medical inspection of all aliens arriving at the various ports in the United States, its possessions and dependencies, is conducted by officers detailed for that purpose.

During the fiscal year 31 commissioned officers and 52 acting assistant surgeons were assigned to this work exclusively. In addition a large number of officers, primarily detailed to other service duty, have examined aliens whenever presented to them.

Those officers of the service stationed at consulates for quarantine duty in Italy have also made inspections of departing aliens at the request of the Department of Commerce and Labor. This work has exceeded in volume and difficulty the quarantine function.

Medical inspection of alien immigrants is now being conducted at 83 stations.

During the fiscal year ended June 30, 1913, 1,574,371 immigrants were examined by medical officers of the service to determine their physical and mental fitness for entrance at ports in the United States and its dependencies, Porto Rico and Hawaii. During the fiscal year 38,558 aliens were certified for physical reasons.

The following table furnishes a summary of the transactions at the several ports in the United States and its dependencies and in Canada:

Aliens inspected and certified at all ports and places in the United States and its dependencies and in Canada.

	Number of aliens examined.	Aliens certified.					Important diseases for which certification was made.										
		Class A (1) Idiocy, imbecility, feeble-minded, epilepsy, insanity, and tuberculosis.	Class A (2) Loathsome, contagious, or dangerous contagious.	Class B Disease or defect which affects ability to earn a living.	Class C Disease or defect of less degree.	Total.	Trachoma.	Tuberculosis.	Insanity.	Idiocy.	Imbecility.	Epilepsy.	Feeble-minded.	Favus.	Syphilis.	Tinea tonsurans.	Gonorrhea.
Aguadilla, P. R.	0	0	0	0	0	0	......	......	......	......	......	......	......	......	......	......	......
Astoria, Oreg.	3,375	1	7	0	5	13	3	0	1	0	0	0	0	0	0	0	1
Baltimore, Md.	33,912	5	86	319	258	668	41	2	3	0	0	0	2	12	0	29	2
Bellingham, Wash.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boca Grande, Fla.	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boston, Mass.	78,706	37	28	617	2,554	3,236	20	7	13	......	1	1	4	4	1	......	1
Blaine, Wash.	384	5	13	4	3	25	9	......	3	......	1	0	1	......	1	......	3
Brownsville, Tex.	4,113	4	177	67	14	262	84	0	0	1	0	1	2	0	1	0	0
Brunswick, Ga.	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buffalo, N. Y.	6,610	27	87	39	83	236	72	......	24	......	......	......	......	......	1	......	8
Calexico, Cal.	176	3	3	0	0	6	0	3	0	0	0	0	0	0	3	0	0
Cebu, P. I.	114	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Charleston, S. C.	18	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	1
Chicago, Ill.	20	6	8	6	......	20	5	1	......	......	......	......	4	1	1	0	0
Del Rio, Tex.	1,248	2	15	2	6	25	13	1	......	1	......	......	......	......	......	......	......
Detroit, Mich.	5,831	31	44	230	338	643	27	9	6	0	0	0	1	0	3	0	12
Douglas, Ariz.	3,104	10	83	1	0	94	81	1	4	0	2	1	2	0	1	0	0
Duluth, Minn.	5,509	21	14	13	0	48	12	0	6	0	0	0	0	0	1	0	0
Eastport, Idaho	3,770	12	1	142	14	169	0	0	1	3	0	1	4	0	0	0	1
Eagle Pass, Tex.	13,777	12	20	40	17	59	17	4	2	0	2	1	1	0	0	0	0
El Paso, Tex.	8,365	12	7	78	1	98	4	5	2	2	......	1	2	......	......	......	1
Everett, Wash.	389	3	0	0	2	5	0	0	0	0	0	0	0	0	0	0	0
Galveston, Tex.	6,060	10	38	215	71	334	32	1	6	0	0	0	3	0	0	0	2
Halifax, N. S.	13,478	8	18	117	271	414	15	1	......	......	......	......	2	......	......	......	1
Hidalgo, Tex.	3,649	1	64	3	1	69	41	......	1	......	......	......	......	......	2	......	2
Honolulu, Hawaii	10,530	2	349	140	2	493	318	1	1	......	......	......	......	......	......	......	1
Houlton, Me.	17	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0

Iloilo, P. I.	439	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
International Falls, Minn.	504	1	3	5	33	42	3	......	......	......	......	......	......	......	......	......
Jolo, P. I.	326	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Ketchikan, Alaska	391	0	0	0	0	0	......	......	......	......	......	......	......	......	......	......
Key West, Fla.	4,305	0	1	1	0	2	1	0	0	0	0	0	0	0	0	0
Laredo, Tex.	35,417	8	37	154	4	203	30	1	1	......	1	2	2	......	......	......
Lethbridge, Alberta, Canada	134	3	......	......	1	4	......	3	......	......	......	......	......	......	......	......
Los Angeles, Cal.	1,986	1	6	0	0	7	1	1	0	0	0	0	0	0	2	0
Manila, P. I.	5,312	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Marcus, Wash.	1,384	2	6	51	18	77	5	1	0	0	0	1	0	0	0	0
Mayaguez, P. R.	163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miami, Fla.	2,853	0	0	0	0	0	0	0	0	0	......	......	......	......	......	......
Mobile (Ala.) Quarantine	153	0	0	7	0	7	0	0	0	0	......	......	......	......	......	......
Montreal, Canada	10,660	60	109	246	199	614	101	33	9	3	5	0	7	1	2	3
Naco, Ariz.	4,925	7	56	6	1	70	26	3	0	1	0	0	3	0	12	0
New Bedford, Mass.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Orleans, La.	3,449	9	33	34	18	94	14	5	2	......	......	......	......	......	13	......
New Orleans Quarantine Station	1,472	0	0	0	12	12	0	0	0	0	0	0	0	0	0	0
Newport News, Va., and Fort Monroe, Va.	31,710	3	10	3	3	19	1	3	......	......	......	......	......	......	3	......
New York, N. Y.	1,044,457	699	1,176	15,287	5,571	22,933	986	38	133	8	48	8	464	41	6	34
Niagara Falls, N. Y.	6,596	11	122	89	39	261	120	4	3	0	0	1	3	0	1	0
Nogales, Ariz.	4,948	1	89	2	0	92	87	1	......	......	......	......	......	......	1	......
Norfolk, Va.	308	1	1	......	1	3	......	......	......	......	......	1	......	......	1	......
Pascagoula, Miss.	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Perth Amboy, N. J.	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philadelphia, Pa.	64,666	14	224	699	1,422	2,359	218	4	0	1	2	......	2	......	2	......
Pittsburgh, Pa.	7	0	3	0	0	3	2	0	0	0	0	0	0	1	0	0
Ponce, P. R.	74	0	1	2	0	3	1	0	0	0	0	0	0	0	0	0
Portal, N. Dak.	661	3	2	2	11	18	3	3	......	......	......	......	2	......	......	......
Port Arthur, Tex.	2,744	16	2	14	80	112	......	......	......	......	......	......	......	......	......	......
Port Huron, Mich.	3,294	19	4	117	122	262	0	4	6	1	1	1	8	0	1	0
Port Inglis, Fla.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portland, Me.	26,421	3	22	20	310	355	17	0	0	0	0	2	0	13	0	0
Portland, Oreg.	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Tampa, Fla.	2,633	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Port Townsend, Wash.	13,597	1	109	58	11	179	21	......	......	......	......	1	......	......	29	......
Providence, R. I.	14,011	5	15	223	155	398	11	1	1	......	......	......	3	1	1	1
Quebec, Canada	25,099	6	14	127	68	215	5	1	2	......	......	......	3	......	1	......
San Diego, Cal.	1,337	0	2	0	3	5	2	0	0	0	0	0	0	0	0	0
San Francisco, Cal.	13,893	7	1,804	65	5	1,888	57	1	1	......	......	......	......	......	2	......
San Juan, P. R.	1,945	5	0	1	0	6	0	2	1	0	1	0	0	0	0	0
Savannah, Ga.	13	0	1	3	1	5	0	0	0	0	0	0	0	0	0	0
Seattle, Wash.	3,299	1	385	40	9	435	6	1	......	......	......	......	......	......	......	......
St. John, N. B.	3,382	2	1	27	21	51	1	......	......	......	......	......	1	......	......	......
Sault Ste. Marie, Mich.	3,140	4	15	46	101	212	8	1	0	0	0	0	0	1	0	0
Sumas, Wash.	1,784	48	6	1	36	91	45	3	3	1	......	......	2	......	1	......
Tacoma, Wash.	1,997	0	17	0	0	17	15	0	0	0	0	0	0	0	2	0
Tampa Bay (Fla.) Quarantine	6,263	0	19	8	0	27	18	0	0	0	0	0	0	0	0	0
Tia Juana, Cal.	4,708	4	23	6	0	29	14	1	......	......	......	1	2	......	......	......
Tucson, Ariz.	146	3	3	5	0	11	2	......	......	1	......	......	1	......	......	......
Vancouver, B. C.	5,106	93	3	8	111	215	80	0	0	2	0	0	0	0	5	0

Aliens inspected and certified at all ports and places in the United States and its dependencies and in Canada—Continued.

	Number of aliens examined.	Aliens certified.					Important diseases for which certification was made.										
		Class A (1) Idiocy, imbecility, feeble-minded, epilepsy, insanity, and tuberculosis.	Class A (2) Loathsome, contagious, or dangerous contagious.	Class B Disease or defect which affects ability to earn a living.	Class C Disease or defect of less degree.	Total.	Trachoma.	Tuberculosis.	Insanity.	Idiocy.	Imbecility.	Epilepsy.	Feeble-minded.	Favus.	Syphilis.	Tinea tonsurans.	Gonorrhea.
Victoria, B. C.	3,242	3	6	21	24	54	4	2	......	......	......	......	1	......	......	......	2
Wilmington, N. C.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Winnipeg, Canada	5,403	111	5	171	58	245	5	8	0	0	0	1	2	0	0	0	0
Zamboanga, P. I.	390	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Total	1,574,371	1,369	5,397	19,583	11,987	38,558	2,704	161	235	25	64	25	534	75	100	67	149

EXCERPTS FROM REPORTS MADE BY SERVICE OFFICERS DETAILED FOR THE MEDICAL INSPECTION OF IMMIGRANTS.

BALTIMORE, MD.

During this year 1,024 ships arrived at this port which were subject to the immigration examination, with a total of 35,013 passengers (steerage 32,294, cabin 2,719).

There were 33,912 aliens examined upon arrival, 31,847 of whom were steerage and 2,065 were cabin passengers. In addition to this number of aliens 1,101 passengers were passed as United States citizens by the immigrant inspectors. This is a marked increase in immigration to this port over the previous year, and has much increased the work at this station. Practically 100 more ships arrived, and the number of arriving aliens exceeded the previous year's record nearly 50 per cent.

While the total number of certificates is 109 more than the previous year, it will be noted that the number certified under the head of "dangerous or loathesome contagious" is less than the previous year. This must be attributed to the activities abroad of the steamship company in endeavoring to avoid the embarkation of those aliens liable to subject the company to fines and deportations—especially the fines.

During the preceding fiscal year there were 61 cases of trachoma and 34 cases of favus certified, while during the past year only 41 cases of trachoma and 12 cases of favus were detected. Many of these 95 cases in the former year might have been detected by means of a competent medical examination prior to embarkation, and they were so certified with the result that the steamship company was fined $100 each for bringing them. A number of similar certificates have been rendered during the past year. By this means it is hoped that the number of aliens embarked, suffering with these diseases, will consequently continue to decrease.

The relatively large number of cases of tinea tonsurans found (29) would indicate that this disease is not being prevented from embarking as diligently as some of the other communicable diseases.

There has been a large increase in the number of aliens detained in local institutions for observation, care, and treatment. This increase amounts to nearly 50 per cent, as the number detained was 454, and they were sent to six different institutions in various parts of the city.

There were 231 cases of acute communicable diseases held for treatment as follows:

Measles	221
Mumps	2
Scarlet fever	3
Diphtheria	3
Erysipelas	2

With the exception of the scarlet fever and diphtheria, which were sent to the small Sydenham (city) Hospital, all of these communicable diseases were treated in the detention house for immigrants.

From December to May, inclusive, 172 cases of measles, practically all children, were treated in the detention house, and 36 of them died. One ship furnished 33 cases.

BOSTON, MASS.

During the last fiscal year 78,706 passengers arrived at the port of Boston.[1] Of these passengers, 66,812 were aliens, of whom 3,236 received medical certificates. There were 379 admissions to outside hospitals in addition to those held for treatment or observation at the immigration detention station itself.

With respect to classification on shipboard and citizenship, the passengers were divided as shown in Table I.

TABLE I.

Class.	Number of citizens.	Number of aliens.	Total passengers.	Proportion of United States citizens.
				Per cent.
First cabin	3,643	1,179	4,822	$75\frac{1}{2}$
Second-cabin	5,309	15,192	20,501	$29\frac{9}{10}$
Steerage	2,934	50,422	53,356	$5\frac{1}{2}$
Stowaways	8	19	27	$29\frac{1}{9}$
Total	11,894	66,812	78,706	$15\frac{1}{9}$

The less efficient precautions taken abroad to prevent diseased or defective persons from embarking as cabin passengers, the comparatively small difference in price between a steerage and second-class passage, certain privileges which it is customary to extend on arrival here to passengers who may be designated cabin passengers, and conference agreements penalizing a company for exceeding its prescribed quota of steerage passengers, are all tending constantly to increase the proportion of so-called second-cabin passengers aboard ships in the Atlantic trade. The importance of an efficient medical examination of such cabin passengers is indicated below in Table II, which shows that practically about 7 per cent of the alien second-cabin passengers are found to be seriously defective or diseased, while only about 5 per cent of the steerage are so certified. In this connection it may be stated that according to the practice of certifying at Boston there are included under Class C only such defects as are deemed to be at least an actual handicap to self-maintenance. Notations of defects regarded as of no practical importance, and so declared to be, were issued to the number of about 1,500 during the year, but no account is taken of such notations in this report.

TABLE II.

Classification on shipboard.	Number of alien arrivals.	Class A and B certificates.	Class C certificates.	Total certificates.	Ratio certified.
First-cabin aliens	1,179	3	3	6	1 : 197
Second-cabin aliens	15,192	227	787	1,014	1 : 15
Steerage aliens	50,422	449	1,764	2,213	1 : 23
Stowaways, alien	19	1	0	1	1 : 19
Warrant cases	....	2	0	2	....
Total	66,812	682	2,554	3,236	1 : 21

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[1] Passengers arriving at Boston on ships from British American ports are examined at the foreign ports of departure and are consequently not included in any way within the scope of this report.

A proper medical inspection of alien cabin passengers on arrival is rendered difficult both because custom dictates that such an examination shall be made on shipboard and because the alien passengers are intimately mixed with a varying but always considerable proportion of returning United States citizens who are by law exempt from a medical imspection of this character. During the past year there has finally been put into operation, with official sanction at this port, a scheme of issuing, by the ship's purser, a distinctive identification card to passengers claiming United States citizenship and of diverting the holders of such cards from the medical inspection, so that they do not appear before the medical officers at all except in individual cases in which the claim of United States citizenship is found by the immigration inspectors to be invalid. This scheme has proved to be entirely practicable and has served to improve greatly the conditions under which the medical officers have hitherto been obliged to undertake their examination of second-cabin passengers. But such conditions are often still far from satisfactory and can not be otherwise so long as it is attempted to make on shipboard the prescribed medical examination of the type of immigrants which forms such a conspicuous proportion of the cabin passengers at this port. Out of 70 alien cabin passengers arriving at this port recently on a regular liner carrying but one class of passengers, so-called second class, 18 out of the 70 were certified as diseased or defective.

From Table III, given herewith, it will appear that there is a wide variation in the proportion of those receiving medical certificates among the different races of aliens and as well in the extent to which such certificates led to deportation. With respect to this last feature, however, the small totals in the case of some of the races enumerated make any positive conclusions unjustifiable.

In connection with the detailed tabulated report covering the conditions actually certified by the medical officers during the year the following may be observed:

Out of 3,236 aliens who received certificates for conditions specifically excludable by the statutory law or for diseases or defects which should raise a serious question as to the individual's capacity for self-maintenance, all but 198 were permitted to enter the country. Belonging in the former category were 65 cases, of which 18 were eventually allowed to land; in the latter, 3,181 cases, of which all but 154 were likewise landed. In other words, the existing system of precautionary examinations to which our annual alien importations are now subjected abroad enabled the transportation interests concerned to reduce the number refused admissions on arrival at Boston by reason of disease or physical or mental defect to about three-tenths of 1 per cent of the total accepted for passage. Moreover, this result is being attained in spite of the fact that nearly 5 per cent were actually found on arrival to be seriously defective or diseased, most of whom had been accepted for passage with full knowledge of their defective condition as good business risks.

In considering the various conditions calling for certification during the year it is to be observed that the number of cases of trachoma and favus are comparatively insignificant, there being but 20 cases of the former and 4 of the latter. This is in keeping with the tendency in recent years at this port and is undoubtedly due to the attention which has been directed to these two diseases for so many years, and the practice of penalizing the transportation companies for bringing cases of these diseases and also in part to be accounted for by the fact that the steamship lines running to Boston are those which have the most efficient systems for the medical examination of prospective passengers prior to embarkation abroad. The number of cases of pulmonary tuberculosis is also relatively small, there having been but 7 aliens certified for this disease during the year. Moreover, it would not appear that aliens actually affected with this disease are entering the country undetected in any considerable numbers.

Among the aliens less than three years in the country and reported to the immigration authorities as public charges from this disease the proportion of such cases in which even prior causes are claimed is strikingly small. It would seem that persons afflicted with pulmonary tuberculosis, the signs of which they are likely to recognize early, do not tend to emigrate. Then, too, a large part of our present day immigration is drawn from districts where pulmonary tuberculosis is comparatively uncommon. These districts are, however, becoming steadily infected by persons who are constantly returning back home after contracting tuberculosis in this country, and there are already indications that the detection of incipient pulmonary tuberculosis is going to become a problem of increasing importance in the medical examination of arriving aliens.

During the year attention has been directed to the detection of insane or mentally defective to a greater extent than ever before.

On January 2 Acting Asst. Surg. Albert J. Nute, who has had the benefit of special study and training in this line of work was assigned for duty at Boston. As compared with the preceding fiscal year there is shown a material increase in this class of cases certified. In this connection there has also been undertaken a systematic study of the intellectual status of the average ignorant illiterate immigrant of different nationalities and races with view to the accumulation of sufficient data to make in the examination of immigrants a clearer differentiation between lack of opportunity and lack of mental capacity than it is at present often possible to make with existing conventional tests. The methods which are being followed at Boston in the mental examination of aliens have been described in detail by Acting Asst. Surg. Nute in a report to the bureau, which is hereto appended.

In connection with this same general subject a study has been made of the cases of the aliens who during the calendar year 1912 were reported from institutions in the New England States to the United States Commissioner of Immigration for action by him with reference to deportation. There were thus reported 133 aliens inmate of such institutions who had been less than three years in the country. The verifications of landing showed that these aliens had arrived at the following-named ports: At New York 78, at Boston 27, at Philadelphia 1, across the Canadian border 16, and at the smaller New England ports 11. Among these insane aliens were representatives of every race and nationality which contributes to New England immigration, including such more recent elements as Turks and Persians. In actual numbers the Irish and Polish lead with 20 each, followed by 18 Italians, 12 Canadians, and 10 Hebrews. As to the various forms of insanity, 74 were reported by the institutions as dementia precox, 11 as manic-depressive insanity, 4 as alcoholic insanity, 2 as paranoia, 2 as paresis, 4 as epileptics, 2 as imbeciles, and in 34 cases the form of insanity was not specified.

In 132 out of the 133 cases so reported the officers of the institutions concerned certified that the causes of the insanity existed prior to arrival. The evidence which they submitted to support this contention and to "satisfy" the Secretary of the Department that the aliens were in the country in violation of law may be summarized as follows:

Previous treatment in hospital on account of mental trouble, 9 instances; testimony of relatives, friends, or acquaintances to the effect that the alien had shown mental peculiarities which might be construed as symptoms of mental abnormality prior to or at the actual time of arrival in the country, 48 instances; alcoholic habits, 4 instances; syphilis, 2 instances; prior epileptic seizures, 4 instances; well-marked imbecility, 2 instances. In 63 instances, or practically one-half the cases reported, the claim of prior causes rested solely on "constitutional inferiority," as inferred from the form of insanity, the degree of dementia, existence of stygmata of physical degeneration, singly or combined.

With reference to length of time in the country it appears that 10 of the 133 cases were reported as inmates of insane asylums within two weeks of arrival. One of these was reported from the Taunton (Mass.) asylum within two days after landing at New York. The remaining 9 came across the Canadian border or entered at the smaller New England ports. Twenty-nine had been in the country from two weeks to six months; 17 from six months to a year; 42 from one to two years and 35 from two to three years. A recently arrived immigrant who becomes an inmate of an insane asylum is almost certain to be identified as an alien subject to action by the immigration authorities but the probability that an alien so admitted to an institution will be reported to the immigration officials grows steadily less the longer the alien may be in the country before such admission. For this reason it seems fair to assume that the number of aliens between two and three years in the country actually admitted to New England insane asylums during this calendar year was considerably more than the number reported. Taking this fact into account and noting the much larger number of admissions during the first six months than during the second six months in the country, it would appear probable that aliens exhibiting demonstrable evidence of insanity on arrival tend to manifest symptoms calling for institutional care within a comparatively short time after landing and that for by far the greater proportion of the aliens finding their way into our insane hospitals in the course of any year it has required more than a year of the mental stress incident to the new environment to develop symptoms calling for institutional care. This conclusion is strengthened by a study of the individual histories of the 133 cases under consideration. Those cases in which evidence of "prior causes" was the strongest coincided usually with short periods of residence in the country. In the great majority of the cases reported there is the same uniform story of an unsuccessful struggle to make good in the occupations in which the alien may have found employment, very often coupled with positive evidence of physical inferiority to his competitors in such occupations, but on examining the claims that the insanity was due to causes existing prior to landing we find in case after case the same necessity of relying in support of this contention on the form of insanity manifested, certain stygmata of physical degeneration and some indefinite mental peculiarities which would not have been regarded as significant if the person concerned had not happened to have found his way into an asylum. As a matter of fact most of these 133 cases were recognizable defectives but at the time of their arrival they were usually indistinguishable from thousands of others similarly defective who never became inmates of asylums or failed to be self-supporting. Furthermore, what actually happens when individual defectives of the very class from which asylum inmates are thus recruited are recognized and certified on arrival clearly appears from the detailed tabulation of certificate cases.

TABLE III.—*Aliens certified and deported at Boston, Mass., by principal races, during the calendar year 1912.*

Race.	Number of alien arrivals	Medical certificates.		Total certified.	Deported.	Ratio certified to arrivals.	Ratio deported to certified.
		Classes A and B	Class C				
Armenian	96	13	12	25	10	1 to 3.84	1 to 2.50
Bulgarian, Servian, and Montenegrian	147	2	8	10	2	1 to 14.7	1 to 5
Croatian and Slovenian	589	1	11	12	2	1 to 49	1 to 6
Dutch and Flemish	495	4	8	12	0	1 to 41.25	....
English and Welsh	9,340	104	484	588	22	1 to 15.88	1 to 26.73
Finnish	1,712	11	30	41	0	1 to 41.75	....
French	362	4	11	15	0	1 to 24.13	....
German	1,075	7	18	25	2	1 to 43	1 to 12.5
Greek	57	2	11	13	2	1 to 4.38	1 to 6.5
Hebrew	2,685	51	163	214	14	1 to 12.55	1 to 15.29
Irish	7,923	65	250	315	8	1 to 25.15	1 to 39.37
Italian (North)	234	1	1	2	0	1 to 117	....
Italian (South)	15,628	139	628	767	64	1 to 20.38	1 to 12
Lithuanian	664	2	3	5	0	1 to 132.8	....
Polish	1,333	7	32	39	3	1 to 34.18	1 to 13
Portuguese	4,588	39	240	279	11	1 to 16.45	1 to 25.36
Russian	907	5	15	20	1	1 to 45.35	1 to 20
Scandinavian	5,247	16	162	178	3	1 to 29.48	1 to 59
Scotch	3,344	35	156	191	4	1 to 17.50	1 to 47.75
Syrian	47	4	15	19	4	1 to 2.47	1 to 4.75
Turkish	9	1	6	7	6	1 to 1.29	1 to 1.17
Other people	491	3	12	15	3	1 to 32.73	1 to 5
Total	56,973	516	2,276	2,792	161	1 to 20.41	1 to 17.34

DESCRIPTION OF METHODS EMPLOYED IN THE MENTAL EXAMINATION OF ALIENS AT THE PORT OF BOSTON, MASS.

In the mental examination work at this station the policy is to utilize every aid that has been worked out by any reliable source with a reasonable degree of recorded success. In this work it has been found necessary to adopt special devices to accomplish the end in view. The work of detecting defectives among arriving aliens is quite different in many respects from that which any institution has to meet and becomes a special line of work in itself. No system of prescribed examination as used by schools or hospitals would be a safe basis, by itself alone, upon which to certify an alien. Every one is a case in itself and a composite picture must be formed rather than to trust the results of any one test. The following system, based on experience and observation at this station, has given a noteworthy degree of success.

Upon boarding a ship the ship's surgeon is asked, in addition to the usual forms, whether he has noticed any abnormal nervous cases (marked nervousness, hysteria, etc.), during the voyage. If so, a brief history of the same is taken and filed for reference. On line inspection the aliens are carefully watched for any signs of mental abnormality, facial expression, deviation from racial temperament, stygmata of degeneration—physical and physiological. Cases so noticed are turned aside and given an examination more in detail.

(1) A physical examination to record physical defects or to group any stygmata of degeneration that may be present.

(2) A mental examination to determine the alien's constructive imagination, intellectual capacity, or mental aberration.

While dense ignorance must not be confounded with feeble-mindedness, there are sometimes cases in which dense ignorance is a sign of defect in itself, when the person is unable to learn although given an opportunity. The detection of the high-grade defective is a subject requiring special care. It is recognized by most authorities that many of the high-grade types can only be detected by more or less long-continued observation and can not be detected by the usual educational or artificial tests in common use.

These cases are skilled in many ways and clever in covering defects. If certified and appeals taken before the courts, they often make excellent showing. This is the type that is unreliable and from which a large percentage of the criminal classes derive their following. They often do excellent work at trades but experience has shown that they have to be watched, for their work is good only when under supervision, and if left to themselves soon follow the line of least resistance. The females of this type are easily led and undoubtedly form a large proportion of the women that live under the control of and furnish a living for a procurer.

The low-grade type is easily detected as a rule, hence does not often elude the examiner of the steerage at the port of embarkation, but has been found from time to time in the cabin.

Another factor to be guarded against is the natural instinct of relatives to give no information that may count against the weak member, hence it is necessary to catch the other members off their guard or by judicious questioning obtain through their ignorance important facts that would otherwise be lost. When parents are present any stigmata of degeneration in one or both are noted. Taking separate histories from several members individually and comparing results often has given valuable information.

Investigation has shown in proof of the above statement that after landing and later seeking hospital aid the parents easily remembered and willingly gave information of the patient's past that had important bearing on its condition. When a suspected child is a member of a family of other children about the same age, comparison with the other children has been found of value.

When it is considered that the alien may belong to an illiterate family for generations, never entered a school building, or had anyone undertake to teach him the simplest rudiments of that which is termed education, never saw a clock except on an occasional visit to the nearest village, and then never had a fair explanation of its mysteries, his occupation digging the soil with primitive implements or tending goats from daylight until dark—for this individual tests must be carefully selected.

Two important rules are followed in every case: First that the alien is examined in a quiet room, as much at ease as possible; second, an interpreter is selected who speaks the dialect of the suspect to avoid any misunderstanding, and the interpreter instructed to put the questions and repeat the answers exactly as given in order that the stenographer present may get any irrevelant answers recorded.

If the suspect is a child the parents' statements are taken as to the details of its early history. Record is made as to age of cutting teeth, walking, talking, investigation for evidence of fits, convulsions, headaches, injuries, nature of birth, operations, prenatal accidents, precociousness, unusual temper, habits of eating, sleeping, and cleanliness. As much as possible of the above history is also taken from the suspect.

The family history is traced for any mental types and note made of any signs of alcoholism, or venereal disease. Ability to read and write is tested, history of school attendance, progress made, and if illiterate, further information as to the reason is sought, as to whether the alien had a chance to go to a school, whether it was denied, whether it was given up because he did not learn, whether the parents were illiterate, and whether any outside means of teaching were sought. The nature of his occupation, whether in the city or country, and different periods of employment, have important bearing on the further examination. For instance, it is an aid to learn whether the alien was a farm laborer or a city mechanic, a wanderer through propensity to travel or inability to hold a situation. If married, the alien is questioned as to his family, their number, health, if not traveling with him why they were left behind. If a single adult, he is questioned as to his attitude toward women.

With this background the examiner is enabled to have a good idea how the rest of the examination may be conducted, whether or not to avoid tests that require educational training.

Estimation is made of reaction time, reasoning power, observation, comprehension, and constructive imagination by the following method: The recognition of simple objects, as thimble, cup, pencil, pen, sugar, salt, keys, coins, penknife, colors, numbers, and letters. Description of simple pictures, fitting together broken objects, and the use of modified apparatus after the plans of Healy, Goddard, and others.

The ability of the alien to name the ship on which he arrived, to answer simple questions as to what he saw en route, the time and by what means he traveled from his home town to the port of embarkation, why he came, what ideas he may have as to future intentions, and his age, in connection with which to tell what his age was four years past and what it would be three years hence.

Following this, his intellectual and moral judgment is brought out by his interpretations of sentences containing impossibilities or gross errors of fact—differences between right and wrong by the use of questions involving lying, stealing, and the proper course for one to pursue, after breaking, injuring, or losing something belonging to another.

Home surroundings are added in order to make sure that the new scenes and questions have not confused the alien to the point of defective answers, but it is also taken into consideration that the defective brain is often very capable in memory of past experiences, quite accurate as to time and place, but it is of value to have this information to see if the alien can form new images from past associations; the normal can, but the defective fails. Questions as to daily duties, recognition of native coins and their value, characteristics of animals and their habits if the alien is from the country, if from the city descriptions of customs and use of appliances in trade. Ability to tell time, to tell something of the origin of various articles of wearing apparel, significance of the principal holidays in his home district, and testing desires by letter or oral request. The latter is of value in bringing out the logical or illogical wishes of the person.

Testing by aid of simple numbers has been found useful, for among the illiterate the child automatically learns to recognize numbers and something of their values, while letters follow more as a matter of educational teaching. To those that have had school training more detailed examination after the method of Binet is used in connection with the general outline described.

Racial viewpoints of life problems are so different that often considerable time and patience must be used before deciding in what class the individual belongs. Sometimes legal appeal taken cites that the alien certified is a fair standard of his race and while he may not compare well with certain other races he ought to be considered on his own racial standard. In these cases it should be considered that it is rather for the alien to conform to a standard for the protection of this country rather than for the United States to seek the standards of other races or people. Of course it may be fairly said that as yet no entirely satisfactory standard definition exists as to what constitutes the morone and different races having different degrees of intelligence. Nevertheless all races do have certain things in common, such as normal reaction to outside stimulation and coordination as shown in their ability to put past images in new combinations.

The question of military service if of age is also investigated to see if the alien has served; been rejected, or discharged for some defect.

Delusions, hallucinations, and illusions if suspected are sought for and traced until satisfactory evidence is offered of the sanity or insanity of the alien. It should always be borne in mind that in handling the large number of people and the limited time that can be given to each that some are sure to pass through, for the inspection is rather more of a sieve than a dam and it would be obviously unfair to write certificates on suspicion alone.

In conclusion the procedure given and used at this station has been with the object of bringing out the fact whether or not the suspected alien has, in his existing social condition, the mental ability to assume normal relations with society in new environment.

Friendly relations exist between the State institutions, State board of lunacy, and this station. This has resulted in interchange of ideas and visits of mutual benefit so that the State officials are familiar with conditions at this port and the efforts made to keep out the mental as well as the physical unfit.

Attention should be called to the fact that the station is sadly cramped for room and badly in need of apparatus, modern books, and files of medical periodicals in order that the efficiency may be kept up.

[Chemical Research form in use at Boston, Mass.]

U. S. Public Health Service,
U. S. Immigration Station,
Boston, Mass., ..., 19...

Name..
Birthplace.................. Age...... Sex.......... Color................
Occupation.................... M. or S.......... R. and W................
Schooling.................................... Alcohol.........................
Family history..
....
....
....
Previous illness..
1. Character of birth.............
2. Accidents...................
3. Nervous.......................
4. Temper........................
5. Fits or convulsions.............
6. Headaches.......................
7. Age of { Cutting teeth................ Talking.................... Walking....................
8. Diseases...........................
Sleep................ Eat................ Bowels...........................
Present mental history:
1. Power of attention..
2. Reaction time...
3. Reasoning power..
4. Ability to grasp opportunity—
a. Observation...
b. Constructive imagination..............................
c. Comprehension..
5. Judgment—
a. Intellectual...
b. Moral...
6. Ability to grasp home surroundings..............................
7. Delusions, illusions, hallucinations..............................
8. Military service..
9. Desires..

Abstract of Physical Examination.

[Presence of abnormality indicated by plus sign (+).]

Name................. Age........ Ship................ Arrived..........
Height............ Weight............ Chest........... Abdomen...........

ABNORMALITIES OF BODILY CONFORMATION.

Obesity..................
Rickets...................
Malnutrition...............
Curvature of spine.........
Disproportion of limbs.....
Deformities of extremities..
Deformities of joints.......
Flat feet...................
Scalp disease.............
Hydrocephaly............
Microcephaly..............
Asymmetry of skull........
Deformity of skull.........
Injuries to skull...........
Malformation of ears.......
Asymmetry of face.........
Hare lip...................
Malformation of nose.......
Malformation of teeth......
Malformation of mouth.....
Malformation of throat.....
Scars of tongue............
Receding chin.............
Cysts......Tumors........

ABNORMALITIES OF SKIN.

Alopecia..................
Pale complexion...........
Cachexia..................
Jaundice.................
Skin disease.............
Wrinkled lips.............
Blue lips.................
Absence of beard..........
Abnormal beard...........

ABNORMALITIES OF EYES.

Ptosis....................
Strabismus...............
Nystagmus...............
Unequal pupils...........
Reaction to light..........
Reaction to distance.......
Vision O. D...............
Vision O. S...............
Choroiditis................
Choked disk...............
Conjunctivitis............
Hemorrhages.............

ABNORMALITIES OF HEARING.

Deafness..................

Occluded auditory canal...

....

ABNORMALITIES OF SPEECH.

Feminine voice............
Dumb......................

Slow speech...............
Defective articulation.....

Incoherent speech.........
Echolalia.................

ABNORMALITIES OF SKIN SENSATION.

Anesthesia.................

Hyperesthesia.............

Paresthesia...............

ABNORMALITIES OF CIRCULATORY SYSTEM.

Temperature...............
Goiter....................
Enlarged glands—
  Neck.................
  Post cervical..........
  Axillary...............
  Epitrochlear..........
  Inguinal ....

Brachycardia.............
Tachycardia...............
Mitral regurgitation........
Aortic regurgitation........
Enlargement of heart......
Irregular action............
Functional murmur.......
....

Pulsating epigastrium.....
Pulsating capillaries.......
Aneurysm ....
Varicose veins............
Varicocele................
Hydrocele.................
Anemia...................
....

BLOOD.

Hemaglobin......Leukocytosis ....
Red cells...White cells...Eosinophilia..

URINE.

Specific gravity...Casts.................
Albumen.........Sugar................

ABNORMALITIES OF RESPIRATORY SYSTEM.

Disease of lungs...........

....

....

ABNORMALITIES OF DIGESTIVE SYSTEM.

Enlargement of liver......
Enlargement of gall bladder

Enlargement of spleen....
Appendicitis..............

Gastroptosis...............
Ascites......Hernia.......

ABNORMALITIES OF NERVOUS AND MUSCULAR SYSTEM.

Romberg's sign............
Ataxic gait................
Spastic movements........
Imperfect muscular coordination.

Choreic movements........
Rocking movements.......
Knee jerk increased.......
Knee jerk diminished.....
....

Ankle glonus.............
Paralysis.................
....
....
....

(For full description of significant abnormalities found see detailed records of the case.)

HONOLULU, HAWAII.

Ten thousand five hundred and thirty aliens were examined on arrival; of these 2,772 were Spanish and Portuguese from Europe and the remaining 7,758 consisted principally of Chinese and Japanese; 10,037 were passed and 493 certified in accordance with the immigration laws and regulations.

On January 1, 1913, the examination of arriving aliens for hookworm was begun, and in the period elapsing 28 aliens were found to be infected; of these, 21 were deported, 4 held and treated until cured, and 3 are pending at the close of the year.

It has become quite a general practice for the surgeons of vessels carrying immigrants to administer thymol during the voyage; this was done on quite an extensive scale with the Spanish and Portuguese immigrants arriving from Europe, and to a lesser extent with aliens from the Orient.

It is questionable whether the administration of thymol to immigrants just previous to arrival is either a safe or suitable routine measure, for the reason that it is believed the drug so stupefies the worm for a few days that no eggs are laid, thus rendering the stool examination probably negative.

MANILA, P. I.

The number of arriving immigrants inspected increased from 3,132 last year to 6,581 this year. The arrivals by port were as follows: Manila, 5,312; Iloilo, 439; Cebu, 114; Jolo, 326; Zamboanga, 390.

The rejections were among the following nationalities: Chinese, 15; East Indians, 52; Japanese, 58; Spaniards, 1; Turks, 1.

At the immigrant medical inspection made at the various ports of the islands the arriving aliens examined were classed as follows:

Chinese	4,037	Mexican	1
Cuban	1	Portuguese	25
Dutch and Flemish	15	Russian	4
East Indians	603	Scandinavians	8
English	118	Scotch	34
French	37	Spaniards	276
Germans	77	Spanish-American	5
Greeks	2	Syrians	2
Irish	9	Turks	24
Italians	21	All other people	6
Japanese	1,273		
Koreans	2	Total	6,581
Magyar	1		

This is the first year that uncinariasis was classified as an excludable disease. There were in all 5,271 examinations made for hookworm of aliens and steerage passengers; of these 388 resulted positively. There were 84 cases of hookworm treated, all of which were negative to subsequent tests except 4, and these were certified and deported.

The percentage of hookworm infection by nationality was as follows:

Nationality.	Number examined.	Number positive.	Percentage with hookworm.
			Per cent.
Chinese	3,954	272	6.87
Japanese	793	64	8.07
East Indians	291	25	8.60
Turks	4	0	.00
Malays	223	27	12.1

The largest percentage of rejections is still due to trachoma. The number from this cause during the year being 90, or 71 per cent of the total rejections, with 83 deportations. The percentage of rejections for all causes was 1.93 per cent, of which 106, or 1.6 per cent of the total arrivals, were deported; and while this percentage is lower than last year, it is believed that it is still a higher percentage of rejections and deportations than is made at the several ports of the United States.

The principal increase in the number of immigrants took place among Chinese, Japanese, and East Indians. By race the East Indians had the largest percentage of rejections, and they were almost all due to trachoma. The Indians, after gaining admission to the Philippines, generally depart for the United States soon afterwards.

NEW YORK, N. Y.

The work performed by medical officers detailed for immigration duty at New York may be classified in four divisions:

(1) *Cabin inspection.*—Officers engaged exclusively in the medical inspection of cabin passengers board incoming ships at quarantine and the inspection is conducted while the ship is proceeding to the dock. This work is of an especially delicate nature because of the indisposition of the steamship companies to cause any seeming annoyance to saloon passengers, the difficulty in segregating aliens from the large number of citizens in the first cabin and the confusion incident to approaching debarkation. These problems are gradually being solved, and in the meantime medical officers have been instructed that the segregation of aliens in the cabin is a function of the immigration authorities upon whom they must necessarily depend for the presentation of such aliens for medical inspection.

(2) *Line inspection.*—The inspection of aliens from the steerage is conducted at Ellis Island and this includes the bulk of the work of medical inspection.

This division embraces the primary line inspection, the secondary examination of those set aside for further physical or mental examination, the designation of cases to be sent to the hospital, reexamination of cases certified and subsequently appealed, and examination of cases in public institutions at the request of the commissioner of immigration. Three daily visits are also made to the detention rooms for the detection of cases of illness and sanitary reports are made to the commissioner when requested. Examination of aliens suspected to be idiots, imbeciles, or feeble-minded is a most important phase of this work, to which an increasing degree of attention is being paid and which has undergone a marked development during the year. One hundred and thirty-two persons of this type were certified during the fiscal year 1912; 520 certificates of this type were issued during the past year. The increase in the percentage of aliens certified for such defects is due to increased experience, improved methods of examination, and the painstaking work in this field which has been done by the officers engaged in it. It is hoped that larger opportunity may be had during the coming year for the prosecution of the original work already tentatively begun. To extend this work and insure rapidity and accuracy in its execution a larger medical force will be required as well as the employment of interpreters for exclusive duty in connection with the medical inspection.

(3) *Immigrant Hospital (General).*—In addition to the varied activities of a general hospital, many aliens are sent to this institution for observation of conditions involving medical certificates. All cases of suspected trachoma and suspected insanity, for instance, are admitted to hospital for diagnosis. A considerable number of suspected feeble-minded are also handled in hospital. These special

duties, which are quite apart from the ordinary routine of a hospital, involve much time and labor and a larger staff is desirable.

(4) *Immigrant Hospital (contagious disease)*.—Infectious cases developing among aliens on shipboard or at Ellis Island are admitted. The majority of patients are children suffering from measles, scarlet fever, and diphtheria. The death rate is materially influenced by the reception of a considerable number of moribund patients and those suffering from more than one infectious disease. On account of the increasing number of patients handled and the congestion in the wards at certain seasons a larger staff—especially a larger nursing staff—is needed. In this connection it may be stated that the sick are brought to Ellis Island from the ships on barges, along with the steerage passengers, and it has been the practice to place all patients, irrespective of the nature of the disease, in a single room on these vessels. This abuse, which accounts for at least some of the multiple infections treated in hospital, has been brought to the attention of the commissioner of immigration, who has made vigorous representations to the steamship companies and a betterment of these conditions is in sight.

During the year passengers arrived at New York from foreign ports as follows:

Aliens in cabin	218, 350
Aliens in steerage	826, 107
Total aliens	1, 044, 457
Citizens (cabin)	143, 070
Citizens (steerage)	23, 508
Total citizens	166, 578
Grand total (aliens and citizens)	1, 211, 035

MEDICAL CERTIFICATES.

Twenty-two thousand seven hundred and thirty-three aliens were certified for physical or mental defects. The certificates are classified as follows:

Class A (I), including 8 idiots, 48 imbeciles, 464 feeble-minded, 8 epileptics, and 133 insane—38 aliens were certified for tuberculosis	699
Class A (II) (dangerous contagious and loathsome contagious diseases)	1, 176
Class B (diseases or defects affecting ability to earn a living)	15, 287
Class C (diseases or defects of less degree)	5, 571

Disposition of immigrants certified.

Class A (I):	
Cases pending at beginning of year	20
Cases certified during year	699
Total to be accounted for	719
Cases deported	624
Cases landed	57
Cases pending at close of year	38
Class A (II):	
Cases pending at beginning of year	31
Cases certified during year	1, 176
Total to be accounted for	1, 207
Cases deported	1, 098
Cases landed	62
Cases pending at close of year	47

Class B:	
Cases pending at beginning of year	167
Cases certified during year	15, 287
Total to be accounted for	15, 454
Cases deported	4, 226
Cases landed	10, 946
Cases pending at close of year	282
Class C:	
Cases pending at beginning of year	10
Cases certified during year	5, 571
Total to be accounted for	5, 581
Cases deported	181
Cases landed	5, 392
Cases pending at close of year	8

HOSPITAL CASES.

In the two immigrant hospitals there were treated during the year, 10,381.

Immigrant hospital (general):	
Remaining at beginning of year	162
Admitted during year, including 29 born in hospital	8, 849
Total to be accounted for	9, 011
Discharged	8, 736
Died	97
Remaining at close of year	178
Immigrant hospital (contagious disease):	
Remaining at beginning of year	54
Admitted during year	1, 316
Total to be accounted for	1, 370
Discharged	1, 062
Died	180
Remaining at close of year	128

CAUSES OF DEATH.

General hospital:	
Cerebro-spinal fever	1
Enteric fever	1
Erysipelas	2
Malaria—	
Estivo-autumnal	1
Chronic	1
Pneumonia, lobar	7
Pyemia	1
Septicemia	1
Tuberculosis	6
Debility	1
Debility, congenital	5
Cerebral meningitis—	
Tubercular	5
Septic	1
Insane	2
Suppuration middle ear	1
Endocarditis	1
Valvular disease of heart	3
Edema, lungs	1
Broncho-pneumonia	28
Inflammation, tonsils, suppurative	28
General hospital—Continued.	
Inflammation gall bladder	1
Enteritis	7
Colitis, ulcerative	1
Peritonitis	1
Chronic	1
Tubercular	1
Ascitis	1
Acute nephritis	3
Chronic nephritis	5
Still birth	1
Premature birth	3
Asphyxia	1
Contagious disease hospital:	
Cerebro-spinal fever	6
Diphtheria	9
German measles	1
Measles	111
Scarlet fever	50
Whooping cough	1
Premature birth	1
Broncho-pneumonia, septic	1

Fifty-nine aliens, requiring immediate attention, were removed upon arrival and cared for by the steamship companies in various hospitals.

Upon the request of the commissioner of immigration medical officers visited 149 aliens who had become public charges or inmates of various institutions in New York and the vicinity and examined them to determine the nature of the disease or defect and to ascertain whether due to causes existing prior to landing.

Summary of hospital transactions at Ellis Island.

Number of patients in hospital at beginning of year	216
Patients admitted to hospital during year	10, 165
Total treated (men 5,420, women 2,431, male children 1,306, female children 1,224)	10, 381
Births (male 15, female 14)	29
Deaths (men 28, women 16, male children 115, female children 118)	277
Pay patients treated during the year	9, 921
Free patients treated during the year	460
Days treatment for pay patients	79, 797
Days treatment for free patients	3, 919
Total days treatment for hospital cases	83, 716
Maximum number of patients in hospital at any one time during year	397
Daily average number of patients in hospital	229
Patients in hospital at end of year	306
Immigrant hospital:	
From previous year	216
Admitted during year	10, 165
Total treated	10, 381
Recovered	5, 302
Improved	1, 989
Not improved	2, 507
Died	277
Remaining end of year	306
Days treatment	83, 716

PHILADELPHIA, PA.

The number of aliens arriving at the port of Philadelphia, for the fiscal year ending June 30, 1913, was the largest in the history of that port.

The total number arriving was 64,666 and of this number, 2,359 were certified on account of disease or defect, physical or mental.

The new immigration detention house at Gloucester City, N. J., was opened for the reception of detained aliens on the 19th of August, 1912, and from then on, the medical officers of the Public Health Service have had charge of the sick and injured among the detained aliens, in addition to the medical inspection of arriving aliens.

Diseases and injuries treated at immigration detention house Gloucester, N. J.

Abscess of scalp	1	Hernia navel	3
Abscess on neck	4	Influenza	1
Abscess on arm	1	Inflammation glands of neck	1
Acute inflammation left ovary	1	Malarial fever	3
Child birth	1	Mumps	1
Convulsions	1	Measles	53
Congestion of liver	2	Pneumonia	4
Constipation	1	Peritonitis, tubercular	1
Carbuncle on neck	1	Scarlet fever	1
Crushed finger	1	Suppuration middle ear	3
Congestion of breasts	1	Tonsilitis	12
Erysipelas	1	Wound of thumb	1
Fecal impaction	1	Wound of leg	1
Hemorrhage from womb	1	Wound of scalp	1
Heart disease	1	Deaths	6

QUEBEC, PROVINCE OF QUEBEC, CANADA.

At the port of Quebec, during the fiscal year (from July 1, 1912, to November 20, 1912, and April 27, 1913, to June 30, 1913) 252 ships, an increase of 21 ships as compared with the preceding year, landed 22,196 passengers, destined to the United States, an increase of 5,229 passengers; also, 7,835 passengers in transit through the United States to Canada via the Grand Trunk Railway system.

The 22,196 passengers arriving subject to inspection by the medical officer of the service, were divided as to citizenship and classification on shipboard as follows:

	Aliens.	United States citizens.	Total.
First cabin	381	1,167	1,548
Second cabin	2,788	2,885	5,673
Steerage	14,081	894	14,975
Total	17,250	4,946	22,196

There were 90 records of minor defects, regarded as of little practical importance as to self-maintenance, and 215 certificates issued for physical or mental defects, which were likely to affect the alien's ability to earn a living.

The port of Quebec was closed as usual the latter part of November and the medical officer was detailed to St. John, New Brunswick, where the inspection of immigrants for the winter season is conducted.

SAN FRANCISCO, CAL.

During the fiscal year ending June 30, 1913, the total number of immigrants inspected by the medical officers of the Angel Island (San Francisco) Immigration Station was 13,893, an increase of slightly more than 3,000 over the number inspected during the preceding year, and of this number 1,888, or more than 300 more than during the preceding year, were certified as presenting one of the various conditions of which notice must be taken under the immigration law.

Of the 1,888 cases certified for all causes 1,740, or about 400 in excess of last year, were certified as being afflicted with uncinariasis. As the method of examination to detect the presence of hookworm is substantially the same as that used last year, the increased number of cases certified is probably due to the greater number of cases examined. The opinion of the medical officer in charge, expressed in the annual report of 1912, that it is quite impossible in oriental races to detect on primary examination—that is, on board ship, by attempting to observe symptoms of anemia, emaciation, lassitude, etc.—anywhere near the number actually infected with hookworm has been greatly strengthened by a year's further observation and emphasizes, when dealing with orientals coming from a known infected region, the futility of any attempt at diagnosis except with the aid of the microscope. During the year data have been kept on oriental applicants for admission showing the age, height, weight, and whether or not the alien presented any visible anemia or lassitude, together with the result, positive or negative, of the microscopical examination. The results are extremely interesting in that they not only show the absence of "apparent" symptoms in a very considerable percentage of infected persons but that very often the microscope demonstrates an infection in people with unusually good physique and healthy appearance. This absence of "apparent" symptoms of course obtains to a certain extent among white races, but seemingly it is more usual among orientals, illustrating possibly a greater degree of immunity or perhaps a greater percentage of "hookworm carriers."

Commencing with January 1 a new system was put in operation by the Immigration Service, namely that of demanding from each arriving alien a medical certificate stating that he was free from infection with hookworm and of refusing to grant hospital treatment to those not supplied with such certificate. The chief medical officer did not feel that such certificates should be accepted as final negative evidence, and the microscopical examinations were continued at this station with the result that while the percentage of infection has markedly decreased our examinations still show such a percentage of positive results as to render their continuance imperative.

Nearly twice as many cases of trachoma were certified this year as last, but only a very few should be considered extremely severe. In fact the number of fines imposed upon the steamship companies for bringing dangerous contagious disease of this type have been very small, it being felt by the medical officer in charge that, speaking broadly, the ships' surgeons were making an earnest effort to eliminate cases of this character and that a legitimate difference of opinion might exist as to diagnosis in mild border-line cases.

Hospital report for fiscal year ending June 30, 1913, United States Immigrant Hospital, Angel Island, Cal.

Diseases.	In hospital July 1, 1912.	Admitted during year.	Total in hospital during year.	Recovered.	Improved.	Not improved.	Died.	In hospital June 30, 1913.
Anemia	....	1	1	....	....	1	....	....
Abrasion, face	....	3	3	1	2	....	....	....
Abscess:								
Foot	....	1	1	1	....	....	....	....
Alveolar	....	1	1	....	1	....	....	....
Accompanying	....	8	8	8	....	....	....	....
Appendicitis	....	1	1	1	....	....	....	....
Blepharitis	....	1	1	....	1	....	....	....
Bronchitis	....	1	1	....	1	....	....	....
Beriberi	....	5	5	....	5	....	....	....
Bubo, inguinal	....	1	1	1	....	....	....	....
Carbuncle	....	1	1	1	....	....	....	....
Carcinoma, stomach	....	1	1	....	....	1	....	....
Conjunctivitis	1	28	29	11	17	1	....	....
Constipation	....	3	3	3	....	....	....	....
Contusion:								
Back	....	1	1	1	....	....	....	....
Foot	....	1	1	1	....	....	....	....
Confinement	....	1	1	1	....	....	....	....
Colitis	....	1	1	1	....	....	....	....
Chancroid	....	3	3	....	3	....	....	....
Cyst, face	....	1	1	....	....	1	....	....
Cystitis	....	1	1	....	1	....	....	....
Diarrhea	....	1	1	....	1	....	....	....
Endocarditis, valvular	....	1	1	1	....	....	....	....
Febricular	....	1	1	1	....	....	....	....
Fracture, femur	1	....	1	1	....	....	....	....
Furunculosis	....	1	1	1	....	....	....	....
Gastritis	....	6	6	....	6	....	....	....
Gonorrhea	....	3	3	1	2	....	....	....
Hysteria	....	1	1	....	....	1	....	....
Hemorrhoids	....	1	1	1	....	....	....	....
Hemoptysis	....	1	1	....	1	....	....	....
Icterus	....	1	1	....	1	....	....	....
Lead poisoning	....	1	1	....	1	....	....	....
Laryngitis	....	....	....	....	....	....	....	....
Measles	....	2	2	2	....	....	....	....
Mumps	....	33	33	28	....	....	....	5
Morphinism	....	1	1	....	1	....	....	....
Myositis, ossificans	....	1	1	....	1	....	....	....
Malaria	....	1	1	1	....	....	....	....
Observation:								
General	....	1	1	1	....	....	....	....
Eyes	....	14	14	14	....	....	....	....
Heart	....	1	1	1	....	....	....	....
Lungs	....	5	5	3	....	2	....	....
Mental	....	3	3	....	....	3	....	....
Uncinariasis	....	6	6	1	....	5	....	....
Otitis media	....	1	1	....	1	....	....	....
Poor physique	....	1	1	1	....	....	....	....
Paralysis	....	2	2	....	....	2	....	....
Pterygium	....	1	1	....	....	1	....	....
Prolapsus recti	....	1	1	....	1	....	....	....
Pemphygus	....	1	1	1	....	....	....	....
Scabies	....	40	40	40	....	....	....	....
Syphilis	....	4	4	....	2	2	....	....
Smallpox	....	1	1	1	....	....	....	....
Sycosis barbæ	....	1	1	1	....	....	....	....
Salpingitis	....	1	1	....	1	....	....	....
Senility	....	1	1	....	....	1	....	....
Tinea versicolor	....	1	1	1	....	....	....	....
Tinea circinata	....	1	1	....	1	....	....	....
Trachoma	7	35	42	24	....	11	....	7
Tuberculosis, pulmonary	....	2	2	....	....	2	....	....
Tracheotomy	....	1	1	....	....	1	....	....
Uncinariasis	55	840	895	856	....	....	....	39
Urethritis, simple	....	2	2	....	2	....	....	....
Total	[1] 64	1,088	1,152	1,013	53	35	....	51

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[1] This figure represents the number of diseases under treatment July 1, 1912, and since uncinariasis and trachoma were in combination in 4 cases this number is 4 in excess of the number of patients in the hospital at that time.

ST. JOHN, NEW BRUNSWICK.

At the port of St. John, New Brunswick (from Nov. 22, 1912, to Apr. 27, 1913), 53 ships, an increase of 9 ships over that of last year, landed 2,920 passengers, destined to the United States, an increase of 1,271 passengers; also 462 passengers in transit through the United States to Canada via the Grand Trunk Railway system.

The 2,920 passengers arriving subject to inspection were divided as follows:

	Aliens.	United States citizens.	Total.
First cabin	21	13	34
Second cabin	185	21	206
Steerage	2,583	97	2,680
Total	2,789	131	2,920

There were recorded 13 cases of minor defects, regarded as of little practical importance, and 51 certificates issued for physical or mental defects, which are likely to affect the alien's ability to earn a living.

DOMESTIC (INTERSTATE) QUARANTINE.

During the past year the work of this division has been very greatly increased and extended. Plague preventive measures in San Francisco and near-by cities have been continued. The suppression of plague in Porto Rico has been completed. Several amendments to the Interstate Quarantine Regulations have been promulgated and are being enforced. Work has been carried on looking to the sanitation of Alaska, the suppression of Rocky Mountain spotted fever in Montana, and the cooperation with the State and local health officers in Ohio and Indiana during the time of flood. Sanitary information has been given to the general public through the medium of the public print. The sanitary inspection of Government buildings has been continued, and measures have been taken toward the prevention of the spread of leprosy in interstate traffic.

Rocky Mountain spotted fever, a disease which is widely distributed throughout the Pacific States, and which exists in virulent form in the Bitter Root Valley of Montana, has been combatted successfully in the latter place by an officer of the Service. Unfortunately the officer in question himself fell a victim to the disease. The Surgeon General assigned another officer to the duty, and it is being carried to completion.

A great forward step has been made by the Bureau in protecting the health of passengers traveling on common carriers in interstate traffic. There has been recommended to the Secretary of the Treasury the promulgation of certain amendments to the Interstate Quarantine Regulations. These amendments have to do with the supplying of pure drinking water and the abolition of the common drinking cup and the common towel. Regulations have also been made regarding the transportation of lepers in interstate traffic. These regulations have apparently been welcomed by the common carriers.

Plague-Suppressive Measures.

Plague-suppressive measures in California and near-by States were carried out during the fiscal year in accordance with the plan which was outlined in the annual report for the fiscal year ending June 30, 1912.

The officers in command of these operations during the fiscal year were as follows:

Surg. D. H. Currie, laboratory operations, March 3, 1912, to July 1, 1913.

Surg. J. D. Long, field operations, April 6, 1912, to July 1, 1913.

OPERATIONS IN CITIES.

OPERATIONS IN SAN FRANCISCO CAL.

During the fiscal year ended June 30, 1913, the following measures for the examination and eradication of rats in San Francisco have been continuously applied:

(1) Measures for the immediate recognition of rat plague should such arise.
(2) Measures for the destruction of rats.
(3) Measures for the destruction of rat-food.
(4) Measures for the destruction of rat harbors and for the permanent rat-proofing of buildings.

Measures for the immediate recognition of rat plague should such occur.—During the fiscal year 9,898 traps spread over the entire city have been in continuous operation. These traps were placed, baited, and inspected daily by a force of Federal employees consisting of 29 expert rat catchers, acting under the direction of 3 foremen. All rats trapped were carefully tagged, giving the exact location where caught and the date, then segregated according to species, and these facts recorded in a journal. They were then forwarded to the Federal Laboratory for the post-mortem examination of each rat.

During the fiscal year 73,533 rats trapped, 16,082 mice trapped, and 980 rats found dead, were forwarded to the Federal Laboratory for examination. Throughout the year 1913 no rats were reported plague infected or suspicious of plague.

The following tabulated statement indicates the character and number of premises trapped, number and kind of traps used, and the resultant catch, and for purposes of comparison a tabulated statement covering similar operations for the fiscal year 1912 is given below.

Character of premises.	1913				1912			
	Premises.	Cage traps.	Snap traps.	Rats trapped.	Premises.	Cage traps.	Snap traps.	Rats trapped.
Stores	899	31	3,156	23,858	758	97	2,915	21,233
Sewers	387	322	98	10,364	289	254	45	8,962
Restaurants	232	14	977	7,823	257	42	1,069	9,766
Stables	177	23	677	4,327	167	46	554	5,710
Dwellings	873	14	2,185	11,887	611	52	1,501	9,368
Factories	103	8	433	3,303	65	19	311	2,250
Water front	....	21	222	1,395	61	33	175	1,295
Vacant lots	61	4	143	1,309	46	4	124	841
Bakeries	20	....	67	458	12	3	42	337
Warehouses	155	9	907	5,070	116	23	605	4,994
Steamers	135	95	1,350	3,203	93	22	334	2,508
Butchertown	24	6	136	536	31	20	190	585
Total	3,066	547	9,351	73,533	1,906	615	7,875	68,122

While the total rat catch for the present fiscal year exceeds the catch for the previous year by 5,411, or an average daily increase of 15, it is to be noted that with but two exceptions the number of premises trapped have been greatly increased in number and the trapping area widened, while the number of traps exposed daily in these premises has been increased by 1,408 traps. Notwithstanding the increase of traps by 1,408, exposed daily, the rat catch per day throughout the city was increased by only 15 rats, indicating by the small catch a reduction in the rat population.

Measures for the destruction of rats.—In addition to the destruction of rats by trapping, incidental to their examination, one other method has been directly applied for the destruction of rats, namely, the placing of rat poison. Poison has proved of especial value for the destruction of rats inhabiting the roofs of city buildings and for the reduction in the number of rats inhabiting sewers. It has also been necessary in ridding large rat-proofed buildings of contained rats, which prior to rat proofing had found harbor and sustenance therein. Poison has been of immense value for the destruction of rats in locations presenting difficult and expensive rat-proofing problems, such as freight depots and yards, the water front, garbage dumps, and butchertown.

The following is a summary of operations for the destruction of rats:

Measures for the destruction of rats.

Rats trapped	73, 533
Rats found dead	980
Mice trapped	[1] 16, 082
Squirrels trapped	16
Gophers trapped	3
Bait used:	
Bacon ... pounds	5, 158
Loaves of bread	4, 929
Poisons placed	1, 658, 460
Loaves of bread used for poison	12, 531

The number of rats destroyed by poison can not be stated with accuracy, but probably far exceeds in number all rats trapped. Results are judged wholly by the evidence of rat carcasses and the absence of rats over the premises poisoned.

Measures for the destruction of rat food.—By rat food is meant waste food or food refuse, such as is thrown carelessly on vacant lots, or around garbage cans, or into imperfect garbage cans, or surplus food thrown to chickens or dropped in transportation or handling.

Complaints covering nuisances of a minor character made by citizens generally, whether involving the question of rats or not, have all been referred to the service for adjustment, since the majority relate in some way to exposed rat food or rat-proofing requirements. Two thousand and fifty-eight separate complaints of this character were investigated during the fiscal year.

The degree of importance accorded rats by the public may be judged by an examination of the following list of segregated complaints. "Rat complaints" far exceed all other "complaints of nuisances," and represent over 20 per cent of all complaints received.

Complaints from San Francisco Board of Health and other sources inspected during the fiscal year ending June 30, 1913.

Rat complaints	459
Manure and stable complaints	230
Chicken, rabbit, pigeon, etc	255
Garbage and defective garbage cans	235
Rubbish complaints	244
Plumbing complaints	189

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[1] The number of mice is an unavoidable incident in the trapping of rats.

Insanitary premises, including shacks	223
Stagnant water	14
Goat, dog, and cat nuisances	94
Fly complaints	72
Mosquito complaints	11
Flea complaints	7
Swine complaints	7
Miscellaneous	18
Total	2,058

It is worthy of special note that but seven complaints relate to flea nuisances, and the frequent comment of citizens generally on the practical absence of fleas in a city in former years notoriously flea infested indicates indirectly the practical value of sanitary rat proofing. The resultant comfort due to flea eradication is a source of general satisfaction, but is of minor importance compared with the importance of the removal of a plague-transmitting insect.

Four thousand seven hundred and forty-seven new garbage cans were installed during the fiscal year. While the imperfect garbage can represents a most important source of rat food, the systematic inspection of all garbage cans in a city of about 2,500 blocks could not be undertaken with the small force available for the purpose. It is estimated that about 20 per cent of all cans at present in use are defective and should be renewed. The practical solution of this problem has not yet been reached. However, it was found that many new cans, defective from improper manufacture, were being installed, and in order to meet this objection an amendment to the garbage can ordinance now provides that all garbage cans supplied householders must first be inspected and approved and so stamped by the board of health before such are offered for sale. The inspection, approval, and stamping of garbage cans manufactured in the city is carried out under the direction of this office.

The following tabulation covers measures for the destruction or protection of rat food:

Premises inspected	73,411
Nuisances abated	16,343
Complaints inspected	2,044
Garbage cans installed	4,747
Chicken yards abandoned	237
Chicken houses concreted	140
Area (square feet)	14,253
Chickens disposed of	7,062
Premises screened	129
Toilets screened	34
Notices served	7,858
Plumbing complaints referred to board of health	186
Vacant lots cleaned	463
Basements cleaned	684
Yards cleaned	972
Premises cleaned of rubbish	1,184
Plumbing nuisances abated	147
Lots from which stagnant water has been pumped	19
Garbage cans inspected, approved, and stamped (stamping begun June 9, 1913)	3,560

Measures for the destruction of rat harbors.—The localities affording rat harborage or refuge have received especial attention, and where such harbors were not amenable to rat-proofing measures they were destroyed. Wooden floors, whether covering yards, basements, or passageways, when lying in close proximity to the ground, afford ideal harboring places for rats, and wherever found they have been ordered removed and the ground area left bare or covered with gravel, cinders, or cement.

The following tabulation indicates the character and extent of the work performed for this purpose:

Measures taken for the destruction of rat refuge.

Floors torn up	430
Basements torn up	467
Yards torn up	257
Passageways torn up	234
Sidewalks torn up	119
Buildings destroyed	1,096
Premises in which wood was piled off the ground	213
Stables destroyed	111
Stables cleaned	180
Manure bins installed	118
Feed bins installed	74

Measures for the permanent rat proofing of buildings.—The permanent rat proofing of all buildings is essential for the complete eradication of rats, and measures for this purpose, as follows, have been continuously applied throughout the fiscal year:

(1) Erection and maintenance of rat-proof buildings only.

(2) Closures of all accidental openings in existing buildings of rat-proof construction.

(3) Remodeling of all nonrat-proof buildings using rat-proof material, or the destruction of such buildings.

The erection and maintenance of rat-proof buildings only.—During the fiscal year building operations throughout the city have been unusually active. Two thousand five hundred and sixty-five new buildings have been inspected during the course of erection to insure proper rat proofing and their examination has required the constant attention of two special sanitary inspectors. All such buildings are required by city ordinance to be erected on concrete or brick foundation walls, and the ground area inclosed by such walls covered with a layer of concrete not less than 1½ inches in thickness. Such concreting, inclosed by proper walls, is essential to the rat proofing of a building, and the requirements of the ordinance has been rigidly enforced.

More than 8,000,000 square feet of concrete was laid for this purpose during the year. The following report covers the character and extent of such operations:

Measures for the permanent rat proofing of new buildings.

New buildings rat proofed		2,565
Basements concreted (4,399)	square feet	4,715,345
Floors concreted (504)	do	2,620,591
Yards concreted (677)	do	389,948
Passageways concreted (675)	do	176,357
Sidewalks concreted (362)	do	217,393
Total laid in new premises		8,119,634

Closure of all accidental openings in buildings of rat-proof construction.—In the annual report for this division for 1912, the discovery of a steady and marked increase in black and roof rats (M. rattus and M. alexandrinus) and the apparent cause for such increase was discussed. This increase was confined to that portion of the city commonly known as the downtown business and wholesale produce section of San Francisco. The conditions present were summarized as follows:

(1) The brown rat is slowly decreasing generally, and has disappeared from rat-proofed ground areas which prevent refuge by burrowing.
(2) The black and roof rat is rapidly increasing and is reinfesting premises formerly occupied by the brown rat.
(3) The substitution occurs principally in theoretically rat-proof buildings through neglect of unnecessary or accidental openings.
(4) Because of the elimination of the Norway rat from the water front, the ship-borne rattus and alexandrinus now find entry and lodgment at this port less difficult.
(5) Rattus and alexandrinus, because of ability to live above ceilings, between walls and on roofs, and because of great cunning and trap-shyness are more difficult to reach with poison and traps, and because of great agility as climbers are more difficult to confine and control.

To meet these conditions the following measures for the eradication of black and roof rats were employed during the fiscal year:

(1) Increased force for the inspection and closure of accidental openings occurring in buildings of rat-proof construction.
(2) Increase in trapping operations within and on the roofs of such buildings and thorough poisoning of their interiors wherever practicable.
(3) Condemnation of temporary frame structures (about 600) within the fire limits.
(4) Greater vigilance for the prevention of escape of rats from ships.

Two inspectors have been constantly employed in the work of inspecting all buildings located within the fire limits of the city. The following is a summary of such work:

Buildings in fire limits rat proofed.

Buildings abated	278
Ventilators on roofs screened	1,248
Ventilators in basements screened	481
Chimney flues screened	857
Windows screened	350
Sidewalk gratings screened	267
Lens lights replaced	420
Doors rat proofed	31
Inclosed dead spaces opened up	38
Openings around pipes closed with cement	7,119
Conduits closed with cement	229
Openings in walls, ceilings, and floors closed by wire, lath, and cement	6,310
Floors complying with sec. 199 (wire cloth)	18
Area (square feet)	24,604
Wood floors removed	18
Area (square feet)	44,114
Floors concreted	71
Area (square feet)	84,643

In order to indicate the value of such rat proofing, reports covering a number of buildings located within this area have been selected at random from the rat-trapper's report, and the total catch of rats, prior to and subsequent to rat-proofing measures, compared as follows. As shown, a marked reduction in the rats in each case was at once obtained. Trapping in such premises will eventually remove all contained rats, and the nuisance should not recur.

Rat catch before and after application of rat-proofing measures.

Location of premises.	Period trapped prior to rat proofing.	Number rats trapped.	Period trapped since rat-proofing.	Resultant catch.
	Months.		*Months.*	
622 Battery	18	1,033	12	9
Powell & O'Farrell	27	532	3	21
Leavenworth & Eddy	22	783	6	82
671 Clay	16	417	14	2
202 Third Street	24	641	18	....
10-12 Third Street	7	288	7	7
Powell & O'Farrell	14	289	4	2
150 Powell	24	340	7	60
Powell & Ellis	23	450	8	11
116-120 Battery	18	475	12	11
717 Market	22	330	17	17

That the measures directed against roof rats have begun to check their increase is shown by the following tabulation of the segregated catch for the previous five years:

Comparative catch of various species of rats.

Species.	1909	1910	1911	1912	1913
Norvegicus	78,360	72,613	58,856	46,597	51,192
Rattus and alexandrinus	4,162	10,509	13,429	21,525	22,341
Total catch	82,792	83,122	72,265	68,122	73,533

NOTE.—Since mus rattus and mus alexandrinus are practically always trapped in the same localities, and in equal numbers, the catch is consolidated

While the total catch of all forms for 1913 exceeds the catch of 1912 by 5,411 rats, this increase, as previously stated, is due to the fact that nearly 1,500 additional traps have been exposed daily in the field. However, with this greater number of traps in use, the increase in roof rats for 1913 exceeds 1912 by only 816 rats; whereas, the increase during 1912 (before the adoption of measures against them) exceeds the catch for 1911 by 8,096. The increase has been reduced over 95 per cent.

Rats trapped on ships.—In the annual report for the fiscal year 1912 it was noted that on ships arriving at San Francisco from foreign countries, practically all rats trapped were rattus and alexandrinus. Among 7,084 rats collected since 1910 only 50 Norway rats were obtained in foreign ships. While Norway rats were found on scows and river boats engaged in local shipping, they were rarely found in transoceanic vessels.

This condition has continued during the fiscal year 1913. During this period 4,736 rats were collected on ships, exclusive of 146 mice found after fumigation.

Record of rats collected on steamers.

	Norvegicus.	Rattus.	Alexandrinus
Trapped	52	1,393	1,758
Fumigated	32	182	1,319
Total	84	1,575	3,077

The Norway rat was trapped in trans-Pacific boats on but two occasions, one was obtained, after fumigation, from the steamer *Nile* and 31 from the steamer *Tricolor*, both ships from China. The remainder (52 Norway rats) were trapped on boats engaged in local trade. It is worthy of note that, whereas 1,319 roof rats (alexandrinus) were found dead after fumigation, only 182 black rats (rattus) were collected. The small black or Indian rat seems to escape fumigation more readily.

The rat guarding of ships.—During the fiscal year particular attention has been given the rat guarding of ships engaged in trans-Atlantic and Pacific trade, and calling at this port. The work has been carried out under the immediate direction of a competent inspector, and in cooperation with the chief quarantine officer, the regulations of the department in this regard have been rigidly enforced. Immediately on docking, such ships are required to place rat-guards on all mooring lines. Shipowners and agents have cheerfully and promptly complied with all instructions relating to their proper construction and disposition.

The guard first adopted followed closely the construction lines of guards used in Manila and reported by Fox, but it was subsequently found necessary to modify such guards by the addition of interlocking braces, and the longitudinal division and hinging of the tube carrying the mooring lines and supporting the wings of the guard. Additional iron braces from the tube to the wings were also supplied to provide stiffness. The changes were suggested by Inspector Ross and various ship machinists along the water front and provide a very efficient and substantial guard.

The following inspections have been made:

Steamers, ships, etc., inspected	64
Inspections made on same	138
Reinspections made on same	228
Regulation rat guards procured	336

Frame structures within the fire limits.—Immediately following the fire of 1906 there were erected within the fire limits of the city to meet the emergency conditions affecting trade about 800 temporary, nonrat-proof frame buildings. Erected without legal status, and alteration or repair being prohibited by building laws, which permit destruction only, it has been impossible to rat proof them. For reasons of equity many have been allowed to stand from year to year; but legal operations against these buildings have been very active during the present year and but 296 now remain. Persistent effort in this direction will be continued, since they constitute ideal rat harbors and add to the difficulty of rat elimination within the business section.

The remodeling of all existing nonrat-proof buildings using rat-proof materials, or the destruction of such buildings.—Under this division is included all frame structures, with or without basements, and generally lacking foundation walls and floors impervious to rats. The majority of buildings within the city fall within this class, and since they permit the easy access of rats, afford refuge and supply food and exist in large numbers, they represent the principal obstacle to be overcome in the rat proofing of the city. This is especially true where such buildings are occupied by stores or markets which prepare food or keep food for sale, such as restaurants, bakeries, fish and meat markets, fruit and vegetable stores, delicatessens, candy factories, etc. Under the city ordinance all such structures in the city wherever found rat infested must be remodeled and constructed with brick or concrete foundation walls extending 18 inches below the surface of the soil and upward to the floor level above. All ground or basement floors must be constructed of concrete, and all floors above basements, where the building contains food products, must be constructed with double floors between which is placed ½-inch No. 20 gauge wire cloth, with the exception that this double floor and wire mesh may be omitted, provided the basement ceiling is left open and unfinished.

The only exception to the above general requirements refers to frame buildings occupying not more than 800 square feet of ground area and lying without prescribed limits (remote portions of the city). Such buildings may be temporarily rat proofed by elevation to a height of not less than 18 inches, with open underpinning.

All buildings falling within this general classification found rat infested and in a generally insanitary condition are inspected, and the owners notified to comply with all city health regulations relating to rat proofing or other requirements necessary to put them in a sanitary condition. Wherever such owners, after notification, fail, neglect, or refuse to comply, the case is transmitted to the board of health with the recommendation that the premises be repaired as required by law or condemned, vacated, and demolished.

The following report covers measures of this character carried out during the fiscal year:

Remodeling of nonrat-proof buildings using rat-proof materials or the destruction of such buildings.

Buildings rat proofed by concreting		1,040
Basements concreted (589)	square feet	528,386
Floors concreted (624)	do	607,078
Yards concreted (196)	do	52,996
Passageways concreted (219)	do	39,837
Sidewalks concreted (371)	do	139,920
Stables concreted (64)	do	92,185
Chicken yards concreted (140)	do	14,253
Total laid in old premises	do	1,474,655
Buildings rat proofed by area walls and wire cloth		106
Area (square feet)		136,605

Report on condemnations.

Buildings submitted to board of health for condemnation	891
Buildings condemned, including rehearings	690
Buildings sent in for condemnation, but not yet heard by the board	201
Buildings condemned and abated	852
Buildings (condemnations) inspected	1,375
Buildings condemned and unabated	322

The application of rat-proofing measures above outlined entails, in addition, the enforcement of all other building and sanitary laws affecting the premises and the business therein conducted.

Before alterations or repairs can be made a permit must be obtained from the board of public works, and where such building is structurally defective, such defects must be repaired. Commonly these relate to insufficient studding, combustible roofs, absence of fire walls, or light wells, and occasionally absence of proper fire escapes. In addition to the repair of walls and floors with concrete, defective plumbing must be replaced or repaired, dirt incrusted walls must be painted or papered, adequate light and ventilation must be provided. Premises used for the preparation and sale of foodstuffs must be properly screened, such as dairy depots, delicatessens, bakeshops, candy factories, fruit, fish and meat markets, restaurants, groceries, etc. Premises used as laundries must have sanitary ironing rooms; concreted and properly drained wash rooms for the reception of dirty linen, adequate and properly lighted and ventilated sleeping quarters for employees. Premises used as stables must be provided with properly constructed and vented manure bins and rat-tight feed bins. In fact, the reconstruction of foundation walls and floors for ratproofing purposes usually insures a cheerful compliance with other sanitary measures, and since the major part of such work is carried out in premises handling foodstuffs, the improved sanitary storage and handling of such products is of direct benefit to the general public. This work is of the greatest sanitary importance to the city.

OPERATIONS IN OAKLAND AND BERKELEY, CAL.

Operations in Oakland and Berkeley have consisted solely of the trapping of rats for the purpose of determining whether plague infection had appeared in those cities. This measure was necessary, as plague has existed for some time among the ground squirrels that infest the rural districts surrounding these cities. Should plague be discovered among the rats, its early detection will permit of adequate measures being taken sufficiently early to prevent an outbreak among the inhabitants of the cities; also to prevent its spread to other localities. These prophylactic sanitary measures are of very great value. Operations directed against plague, if properly carried out, not only prevent the occurrence of plague, but act directly to diminish the incidence of other contagious diseases. In addition, the public becomes educated in and familiar with sanitary measures, and as the process, in the absence of an epidemic, progresses slowly and gradually, the expense is not considered as burdensome. It has been shown and can easily be demonstrated that the steady diminution in morbidity and mortality that follows in the wake of properly applied sanitary measures more than repays the expense incurred, and provides, as well, an efficient safeguard against the occurrence of epidemic disease, with its attendant loss of life and property.

During the year 40,401 rats were collected in Oakland and Berkeley and sent to the laboratory for examination. No plague infection was found.

OPERATIONS FOR THE ERADICATION OF PLAGUE AMONG GROUND SQUIRRELS.

The squirrel free zone around the cities bordering upon San Francisco Bay, which has been described in previous reports, was maintained throughout the year. A zone 1 to 2 miles in width, extending from the vicinity of San Leandro, in Alameda County, through Contra Costa County to the Bay of San Pablo, is now practically free from squirrels, except in those places where reinfestation has taken place to a small degree along its margins. Whereas, in previous years plague infection had been demonstrated among the squirrels upon this zone, careful hunting has failed to discover any infection upon the zone proper during the year just passed, though infection has been found in contiguous territory. A total of 90,018 acres of land have been treated. Sixty-seven thousand one hundred and seventy-two acres were treated with poisoned grain and 22,846 acres have been treated with the squirrel destructor. The camp upon the squirrel free zone has been utilized not only for the purpose of pre-preventing the contact of infected squirrels from the rural districts with rats of the cities, but has been utilized as a camp of instruction for all new employees and for the purpose of giving further instruction to old employees; in addition, extensive researches as to the life habits of the squirrel, and investigations of methods to compass his destruction, have been carried on as well.

A number of excavations were made in order to determine the average length, diameter, and cubic capacity of a squirrel burrow. In addition, a smoke or smudge apparatus, to be described later, was used for the same purpose. As a result of these investigations it was found that the average squirrel burrow is 15 feet in length, 3½ to 4 inches in diameter, and has a capacity of 1.45 cubic feet. Diagrams of representative colonies are inclosed. Attention is invited to the one diagram, which shows graphically what has been designated a two-story "apartment," one set of burrows being at a lower level than the others in the same colony.

In the Public Health Reports of September 27, 1912, there appeared an article describing a squirrel destructor. Its purpose and the general principles of operation were described in that report. Since that time extensive tests of that apparatus have been made, and it has been found to be an exceedingly efficient and economical apparatus for the destruction of squirrels. In order that the advantages of this apparatus might be conserved to the public, a patent was applied for by the inventors, Surgs. J. D. Long, D. H. Currie, and Passed Asst. Surg. Friench Simpson. Patent was granted under date of April 22, 1913; No. 1059622. This patent was dedicated to the public, and provided that this machine may be used by the Government, or any of its officers or employees, in the prosecution of work for the Government, or by any other person in the United States, without payment of any royalty thereon. In addition to the investigations made to prove the efficiency of the squirrel destructor, numerous other experiments were made, which will be but briefly touched upon. An apparatus was devised for the production and use of carbon-monoxide gas. As the apparatus showed an efficiency of only 90 or 92 per cent and required two men for its operation, it was decided that it would not be economical, and the apparatus was used thereafter for the purpose of a smoke or smudge machine, for the study of the extent and ramification of squirrel burrows and colonies, for which use it was very adaptable.

Experiments were also made by placing waste balls saturated with carbon bisulphide in burrows. This method showed an average efficiency of 90 to 92 per cent. The cost of this method was practically the same as for the squirrel destructor, but as its efficiency was much lower its use was abandoned.

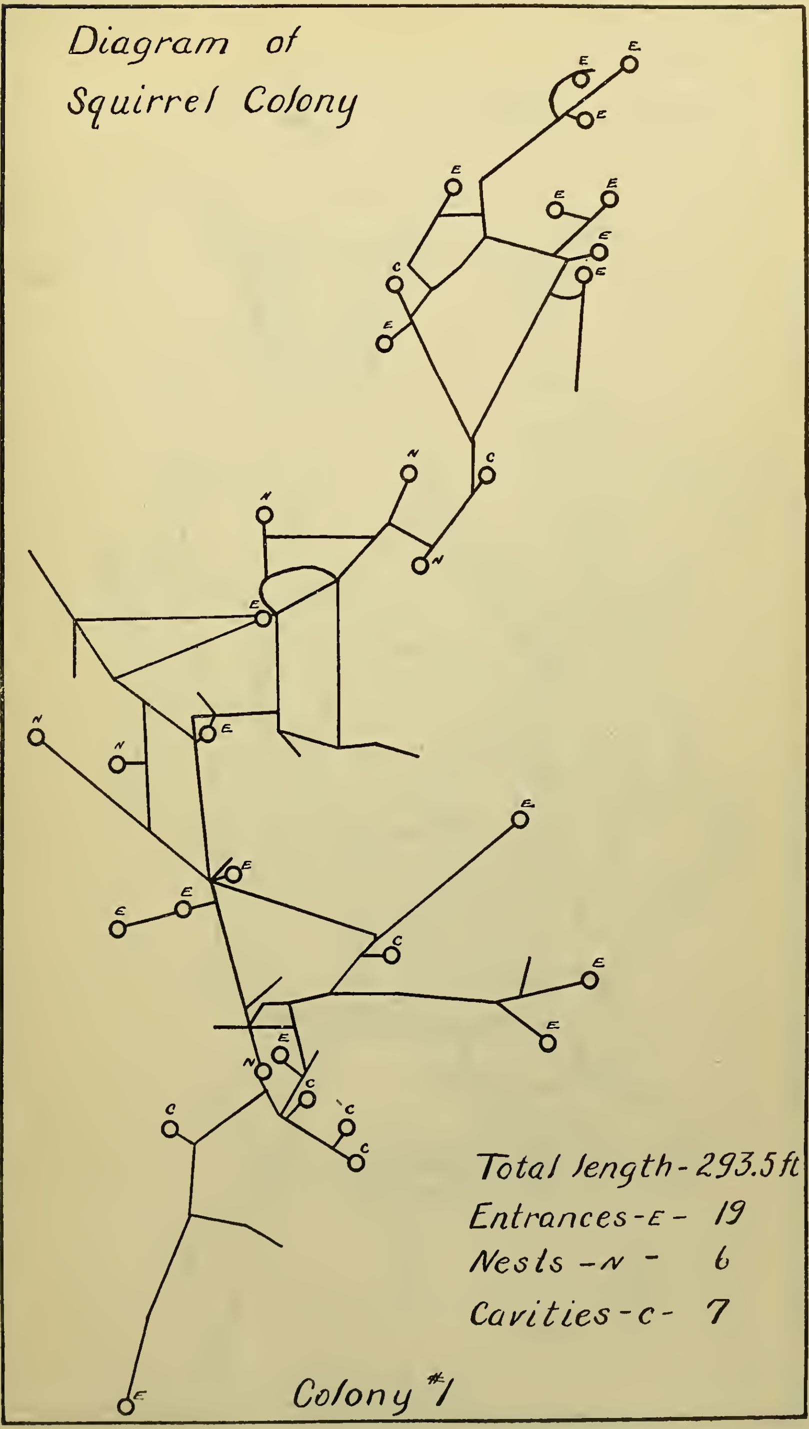
Diagram of
Squirrel Colony
Total length - 293.5 ft
Entrances - E - 19
Nests - N - 6
Cavities - C - 7
Colony #1

FIGURE 1.

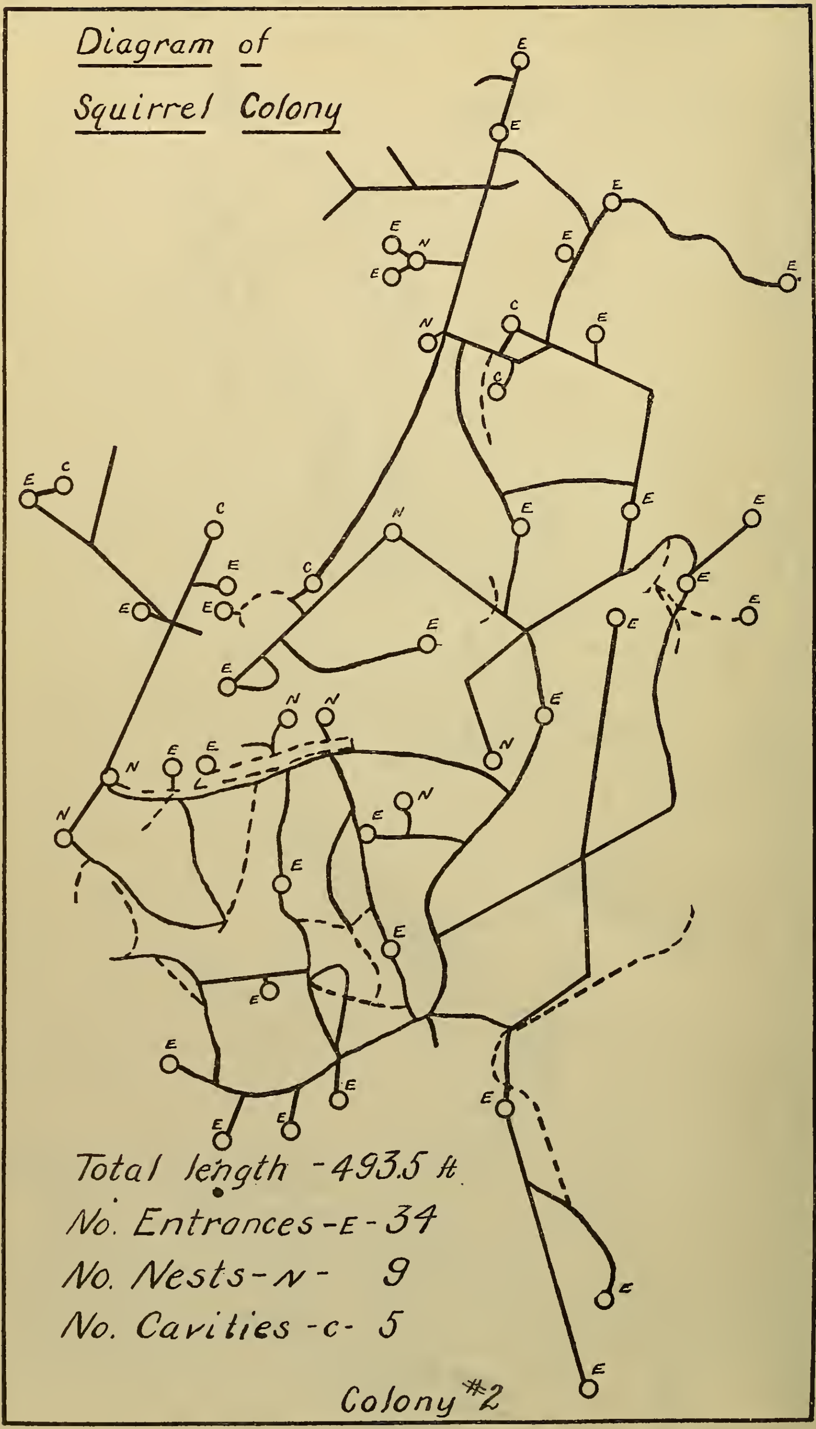
Diagram of Squirrel Colony
Total length - 493.5 ft
No. Entrances - E - 34
No. Nests - N - 9
No. Cavities - C - 5
Colony #2

FIGURE 2.

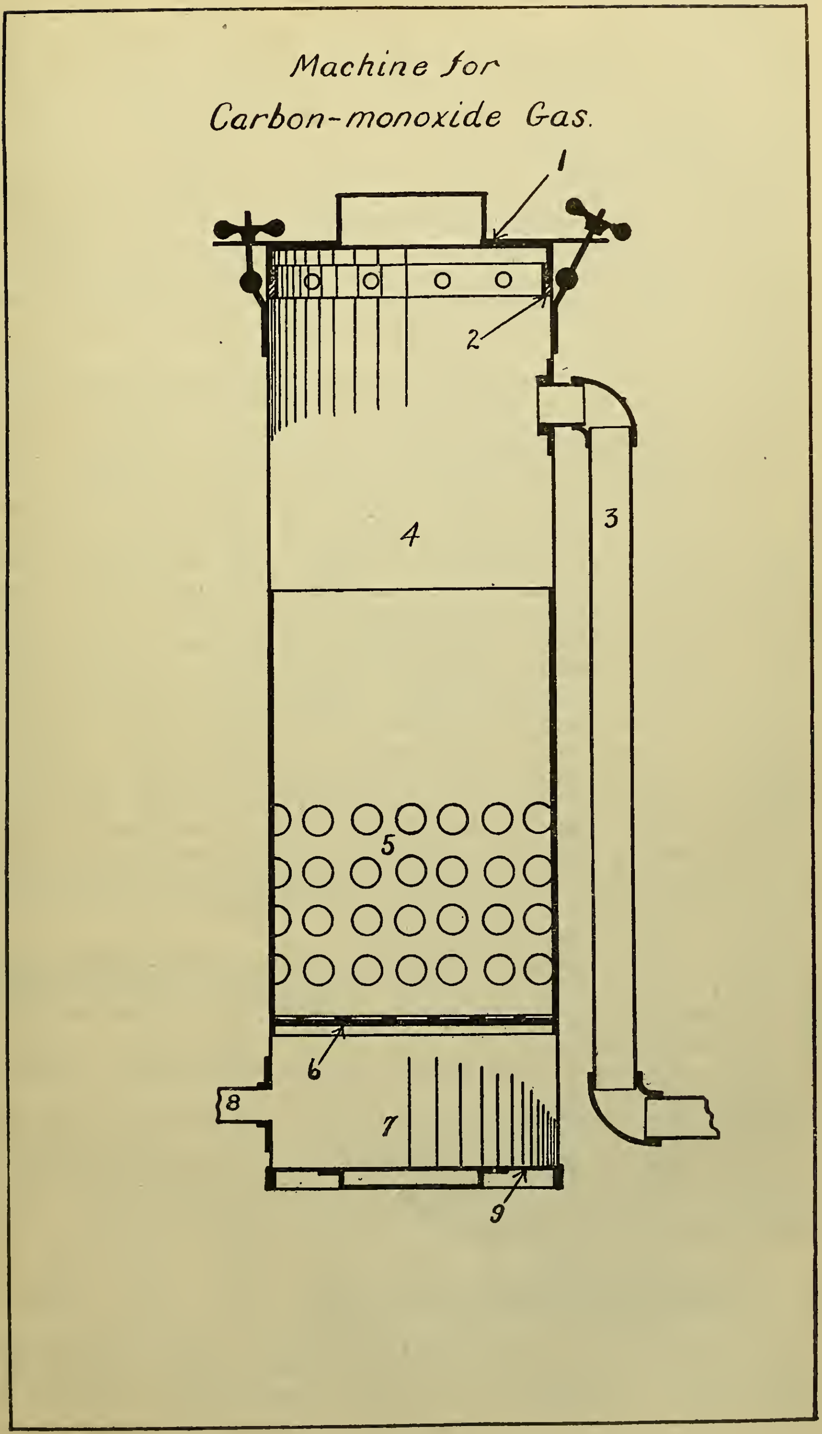

FIGURE 3.

Experiments were also conducted with dynamite. This agent, when properly and intelligently applied, was very efficient, but its use required a detailed study of the class of ground in which it was to be applied and a greater exercise of judgment than it was felt would ordinarily be used, and its cost was high as compared to other equally efficient methods.

In addition to the above, various methods of squirrel destruction submitted by individuals were investigated or tested as to their advantages or applicability, and inventors and others were encouraged to submit any ideas or apparatus that they might have for examination as to their usefulness, with the result that several types of apparatus were presented but were eventually discarded as not being practicable, either from the standpoint of cost of operation or efficiency.

As a result of the above briefly outlined experiments it was finally determined that the squirrel destructor used in conjunction with poisoned grain could be expected under average conditions to give an efficiency, with one treatment, of from 98 to 100 per cent. The cost was found to vary from 2¼ to 3 cents per hole, depending upon the infestation per acre and the distance of one hole from another. The average cost per acre for labor and materials only of service operations has been about 28 cents. One treatment of the land is found to be sufficient. An interesting observation is that in from six weeks to two months after a piece of land has been treated the small number of squirrels that are left scattered over the territory will establish themselves in small colonies of from three to one-half dozen squirrels here and there over the land, with no squirrels between. This discovery has rendered possible the complete extermination of squirrels by a second treatment of the land at a comparatively small additional expense. It is believed, however, that after squirrels have been eradicated to the point indicated it will not be necessary to treat the land a second time, as the competition among the natural enemies of the squirrel, which are dependent upon the squirrel for sustenance, will be so keen that the destruction of the remainder by this means will be the matter of a short time only.

Careful cost data were kept of all operations in the camp on the squirrel free zone, and as a result of a careful and detailed analysis of the data obtained it has been possible to work out an equation which will indicate:

(1) The cost per acre of treating the land with the squirrel destructor, considering labor and materials only.

(2) It will serve to indicate whether work is being done economically upon land being operated.

(3) It will permit of an estimate of the probable cost of eradicating the squirrels from a given piece of land being made in advance, so that the owner may know within a reasonable limit what the cost of ridding his land of squirrels should be.

The equation is as follows:

$X=2.43Y$ plus 6.48.
X=cost per acre in cents.
Y=the average number of burrows per acre.

This equation has been tested continuously in the work and has been found to be accurate within 5 per cent on either side of the actual cost. In addition to the above, accurate data were kept of

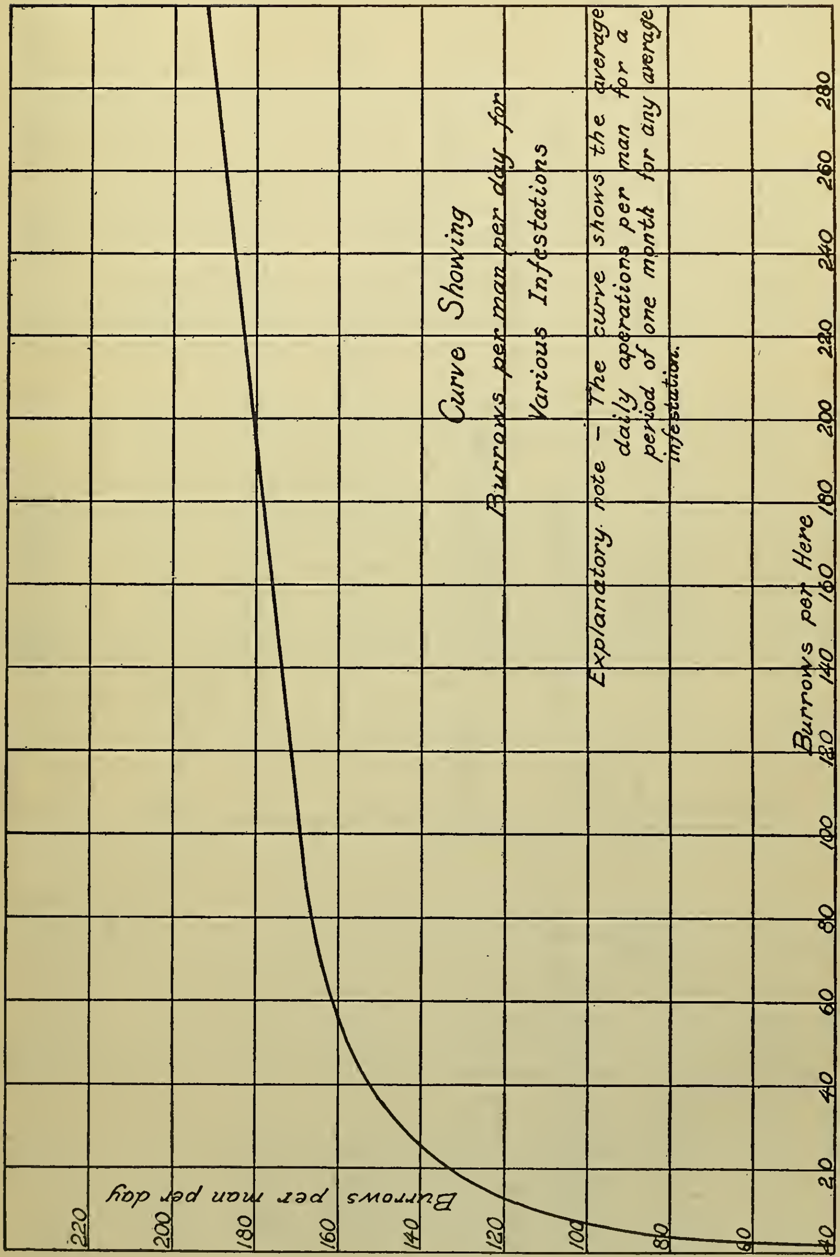
Curve Showing
Burrows per man per day for
Various Infestations
Explanatory note – The curve shows the average daily operations per man for a period of one month for any average infestation.
Burrows per Here
Burrows per man per day
40
20
40
60
80
100
120
140
160
180
200
220
240
260
280
60
80
100
120
140
160
180
200
220

FIGURE 4.

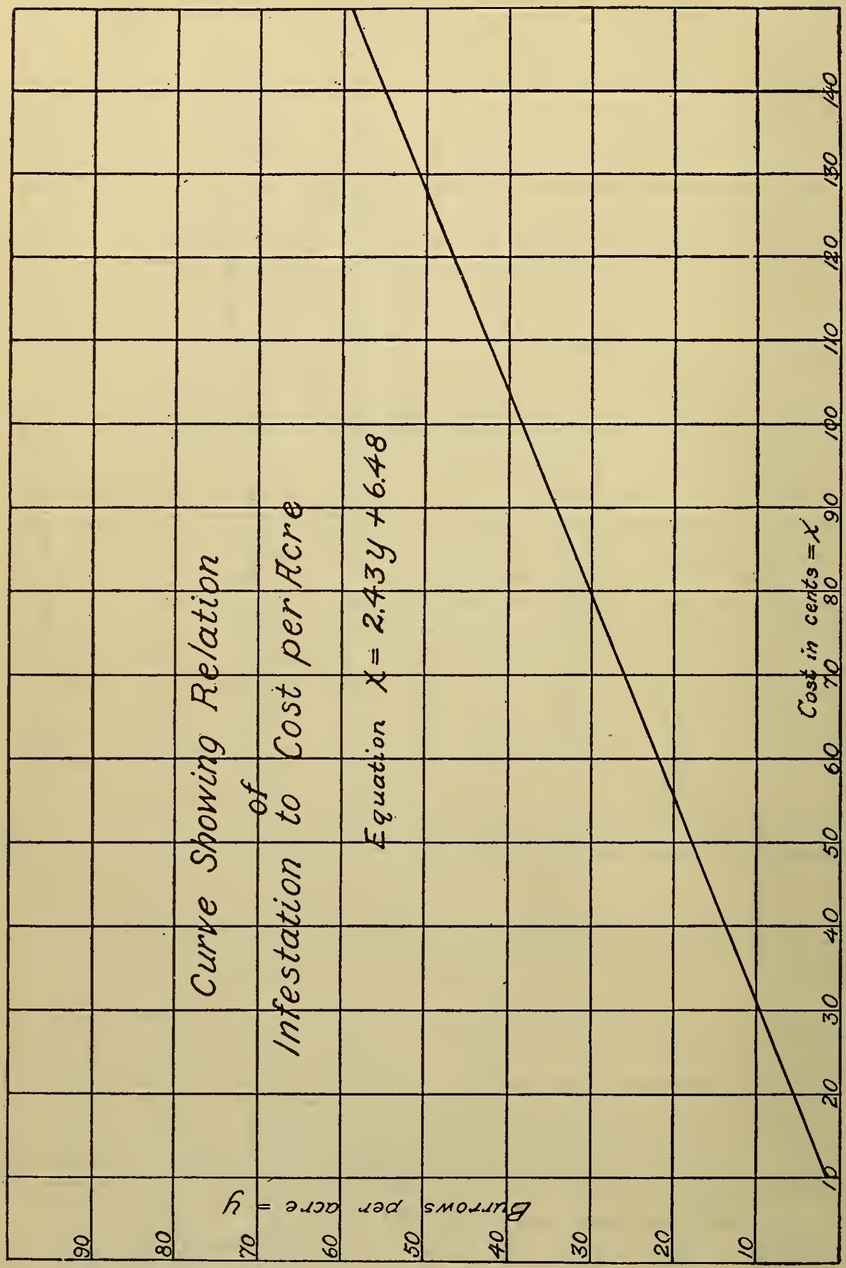
Curve Showing Relation
of
Infestation to Cost per Acre
Equation x = 2.43y + 6.48
Cost in cents = x
10
20
30
40
50
60
70
80
90
100
110
120
130
140
Burrows per acre = y
10
20
30
40
50
60
70
80
90

FIGURE 5.

the number of burrows treated by the men at work in the camp. From the data obtained a curve was plotted (Fig. 4) which serves to indicate the average number of holes that each man should treat each day for a given infestation. This curve has also been used continuously in the work, and by its use it has been possible to determine when the work lagged or the men were not doing their full duty, and the attention of the foreman in charge could be immediately called to the fact that his men were not doing full duty.

At present investigations are being carried on for the purpose of devising a means of estimating with a reasonable degree of accuracy the infestation upon the varying classes of land, the idea being to utilize this method for the purpose of furnishing a reasonably accurate estimate to landowners as to the infestation upon their lands and the cost of eradicating squirrels upon the same. These investigations will be completed within a short time, when the method evolved will be placed in general use.

OPERATIONS EAST OF THE SAN JOAQUIN RIVER.

In the annual report of 1912 appeared a description of the operations of a camp which had been placed in the vicinity of Ripon and Modesto to eradicate foci of plague and prevent the advance of the disease eastward to the foothills of the Sierras. In cooperation with the county and landowners an area approximating 160,000 acres was thoroughly poisoned for the eradication of squirrels. Careful hunting carried on for almost a year since the completion of those operations has failed to discover any plague among the few squirrels that remain. Hunting was finally discontinued on account of the fact that hunters were unable to turn in more than one or two squirrels per man per day.

OPERATIONS IN ALTAMONT PASS.

The annual report of 1912 described operations begun in April, 1912, in Altamont Township, of Alameda County. The operations were carried on for several reasons.

First. Altamont Township was probably one of the worst infected spots in the State. Infection ran as high at times as 10 per cent of the squirrels shot, plague septicemia being at times as high as 60 per cent.

Second. In order, therefore, to eradicate a highly dangerous focus, and in order to learn whether it was possible by the means at hand to destroy squirrels to the point that plague infection would disappear from among them, and in order also to find out with accuracy the cost of such operations, it was decided to rid this whole township of squirrels, if possible. Operations were discontinued in September, 1912.

A total of 24,760 acres was treated with poisoned grain, the land being covered from four to five times. Considerable aid in the form of labor was obtained from local landholders. The cost of the operations was found to average 40 cents per acre. As nearly as could be determined, from 85 to 90 per cent of the squirrels were destroyed, and careful hunting during 1912, and during the breeding season of 1913, failed to discover any plague infection within the limits of the township. The following facts were elicited:

The cost of grain operations is higher per acre, upon an average, than the cost with the squirrel destructor. The patience and perseverance to accomplish the percentage of eradication obtained is such as can not be reasonably expected from any individual whose prime interest is not in the destruction of squirrels. The percentage of eradication is not so high as can be obtained by other means. The fact that 85 to 90 per cent reduction will eradicate plague among squirrels affords a great deal of satisfaction as no certain data were obtainable prior to these operations which would indicate the percentage of destruction necessary to eradicate plague from among these squirrels.

INSPECTION OPERATIONS.

During the year, inspection of lands and serving of notices was continued as in the past. Operations were conducted in the following counties: Contra Costa, San Benito, Santa Clara, Merced, Stanislaus, Alameda, San Joaquin, Santa Cruz. Operations could not be conducted in the counties of Fresno and Monterey, on account of the shortage of men. A total of 3,546 ranches were inspected during the year.

HUNTING OPERATIONS.

Squirrels shot	30, 643
Squirrels found dead	1, 090
Total	31, 733

There were examined 30,845 squirrels and 680 were found to be plague infected. At the beginning of the fiscal year 74,901 acres of land were known to be actually plague infected. As a result of the hunting operations to October, 1912, this area was apparently increased to 125,146 acres. This was probably not an actual increase of infected territory, but an apparent increase, due to the discovery of foci heretofore unknown but which had probably existed undiscovered until intensive hunting operations brought them to attention. Later hunting operations have increased this area still further by about 10,000 acres more, making a total to June 30, 1913, of 135,146 acres of known infected land. Much of this land has since been treated and the infection entirely eradicated. In 1912, to July 1, there were shot on the infected and adjoining territory 16,957 squirrels. Of these, 506 were infected, and so far as determined, about 50 per cent of these had the disease in its septicemic form. In 1913, to July 1, there were shot on the same territory, with more hunters in the field, under conditions as nearly parallel as possible, 10,369 squirrels, 279 of which were infected, but only 3.6 per cent had the disease in the septicemic form. There was, therefore, an apparent reduction in squirrels of 37.7 per cent, a reduction in the percentage of infected squirrels of 10 per cent, and a reduction in septicemia of 92.8 per cent. It is believed that the actual reduction in percentage, of infected squirrels is much larger than 10 per cent as in 1912 every suspicious squirrel was inoculated into a guinea pig, that positive diagnosis could be made. In 1913, owing to a scarcity of guinea pigs, this measure could not be taken, and diagnoses had to be made on post-mortem appearance only.

HUMAN CASES.

But one human case occurred during the fiscal year. This case was that of a Japanese woman, a strawberry picker, residing on a ranch near San Juan, San Benito County. The patient died June 13, 1913. As infected squirrels had been found in the immediate vicinity, and no rats or rat signs were discoverable about her place of residence, it is believed that the infection was obtained from ground squirrels.

SUMMARY OF RESULTS OBTAINED.

First. Through the operations that have been conducted in the cities around San Francisco Bay, sanitary conditions have been materially and constantly improved.

Second. Through the maintenance of the squirrel free zone the reinfection of the bay cities has been prevented.

Third. Through the operations of the service in those areas east of the San Joaquin River, and in the Altamont district of Almeda County squirrels have been almost eradicated, and infection among them has been entirely eradicated.

Fourth. A satisfactory and economical means of squirrel eradication has been devised, placed in use, thoroughly tested, and is now in general use, not only by the Service but by landowners generally.

Fifth. An efficient system for the conducting of operations has been developed and placed in operation, and adequate means for checking all operations has been evolved and is now in constant use.

Sixth. As a result of the systematic methods of operation and the efficient means of eradication that have been devised, widespread interest has been aroused among the boards of supervisors and landowners generally, and hearty cooperation is being obtained where indifference and opposition were encountered before.

ECONOMIC BENEFITS THAT MAY BE DERIVED FROM SQUIRREL ERADICATION.

While it has been generally known for years past that squirrels are capable of and do cause a great deal of financial loss each year to landowners no reliable figures as to the amount of loss that is suffered have heretofore been obtainable. Various estimates have been made for the entire State, which average generally about $10,000,000 per year. In connection with other investigations that were being made actual measurements were obtained which show the amount of damage done by squirrels on pasture lands alone, and it was fairly conclusively shown that 20 squirrels can in one year's time destroy enough pasture to maintain one head of stock. At prevailing prices it costs to purchase feed for one head of stock $3 per month. As the cost of destroying these squirrels should not exceed 3 cents per head the financial returns to be derived from their destruction can be readily appreciated.

No accurate figures could be obtained as to losses suffered on other types of land, but instances are on record which show that losses amounting to thousands of dollars can result from burrows in irrigation ditches, canals, and similar projects with resulting overflow, and hundreds of dollars damage has resulted in a year from destruction on alfalfa lands. Similar losses have been incurred in orchards of various kinds. Great numbers of young trees have been destroyed and one methodical farmer made the statement that his losses in grain each year were of such size that he would save money if squirrels could be destroyed at an average cost of 10 cents apiece—more than three times the actual amount necessary to eradicate them by present approved methods.

REQUESTS FOR ASSISTANCE.

During the fiscal year it was found that large landowners were more inclined to proceed with the eradication of squirrels from their lands if expert supervision could be provided, and in a number of instances requests have been made that foremen be furnished to take charge of gangs of laborers furnished by the landowner—he supplying all materials needed. These requests have come in so frequently of late that the Service has been hard pushed to furnish an adequate number of foremen without seriously interfering with the work of inspection and serving of notices. The force in the camp on the squirrel free zone has been depleted to the lowest point that it has ever been by the withdrawal of men for the purpose above stated.

The following projects are actually under way, the service furnishing supervision only, the landowner furnishing all the labor and materials:

	Acres.
The McLaughlin Co., Santa Clara County	22, 000
Miller & Lux, Santa Clara County	22, 000
Stanford estate, Santa Clara County	8, 000
Spring Valley Water Co., Santa Clara County	28, 000
New Almaden Mining Co., Santa Clara County	7, 000
The Moraga Co., Contra Costa County	12, 000
Peoples' Water Co., Contra Costa County	20, 000

In addition to the above, a number of small landholders began operations under direction of a traveling foreman with labor furnished by themselves and materials furnished by themselves and the counties jointly.

Inquiries have been received in regard to furnishing supervision during the coming fiscal year over a total area which will aggregate 450,000 acres.

ATTITUDE OF THE COUNTIES.

Boards of supervisors have looked with much greater favor upon the continuance of the work than heretofore, and a resolution substantially as follows has been passed by the counties of Alameda, Santa Clara, Santa Cruz, Stanislaus, San Benito, Merced, San Joaquin:

In the Board of Supervisors of the County of ——, State of California.

In the Matter of the Extermination of Ground Squirrels and Other Rodents in ——, Cal.

RESOLUTION.

Whereas the board of supervisors of —— County has become convinced of the necessity for the eradication of ground squirrels within said county for both public health and economic reasons; and

Whereas many property holders have failed to proceed and continue in good faith to endeavor to exterminate and destroy such rodents, as provided by law, now, therefore, be it

Resolved, That this board of supervisors requests, and it does hereby request, that the United States Public Health Service and the California State Board of Health proceed as soon as practicable, through inspectors or other authorized agencies, to serve reasonable notice upon all property holders in —— County whose lands are infested with ground squirrels to proceed to exterminate and destroy such rodents as provided by law: and be it

Further resolved, That in all cases where said property holders fail, refuse, or neglect to comply with the law, after having been duly notified, this board will allow and pay the expense of exterminating and destroying such rodents, as provided by law, whenever bills and vouchers for said expense are presented, after having been properly certified by the medical officer of the United States Public Health Service, in charge of field operations, acting in cooperation with the California State Board of Health.

The county of Monterey has expressed a willingness to pass a similar resolution as soon as men can be detailed to that county. The counties of Contra Costa, Alameda, Santa Clara, San Benito, and San Joaquin have agreed to pay the livery hire and purchase a certain amount of supplies and materials needed by inspectors that have been or may be detailed to duty in their respective counties. In addition, individual members of the boards have urged upon landholders the necessity of complying with the law in regard to squirrel eradication, and have used their personal influence in many instances in furtherance of the work.

LEGAL STATUS OF THE WORK.

Due to the fact that the Supreme Court of the State of California had, some years ago, declared an ordinance substantially similar to the act of March 13, 1909, unconstitutional, it was felt that it would be unwise to attempt to force, through the medium of the courts, compliance with that law. Efforts, therefore, were made to induce people to rid their lands of squirrels by such other means as could be brought to bear. When these facts were properly presented to the State board of health, and by the State board to committees of the legislature, the following act was passed:

[Senate bill No. 160.]

Chapter 422.—An act to prevent the introduction, and provide for the investigation and suppression of contagious or infectious diseases, and appropriating money to be used for such purpose. (Approved June 7, 1913.)

The people of the State of California do enact as follows:

Section 1. The sum of $100,000 is hereby appropriated out of any moneys in the State treasury not otherwise appropriated, to be expended by the State board of health, under the direction of the governor, for the prevention of the introduction of Asiatic cholera, bubonic plague, smallpox, or other contagious or infectious disease into this State, and for their investigation and suppression in case of their origin or introduction. The claims for such expenditures must be audited by the board of control, except that when, in the opinion of the governor, an emergency arises which demands or necessitates the immediate use of money for the purposes herein provided, the controller must draw his warrant in the name of the governor without such audit, on account of the sum hereby appropriated, upon the order of the governor, in such sums, from time to time, not exceeding $1,000 at any one time, as he may direct. In cases where sums are so drawn upon the order of the governor without audit by the board of control, vouchers must be thereafter filed with the controller, showing the manner and the purposes for which such sums have been expended. Such portion of the sum provided by this section as may be deemed advisable by the State board of health and approved by the governor may be used in accordance with the provisions of this section and section 2: *Provided*, That all expenditures connected therewith shall be audited by the board of control and paid by the State treasurer upon warrants drawn by the controller, in accordance with the provisions of this section.

Sec. 2. Whenever any land, place, building, structure, wharf, pier, dock, vessel, or water craft is infested with rodents, insects, or other vermin which are liable to convey or spread contagious or infectious disease from an existing focus declared by the State board of health, it shall be the duty of said board to at once notify the person, firm, copartnership, company, or corporation owning said land, place, building, structure, wharf, pier, dock, vessel, or water craft of the existence of said rodents, insects, or other vermin, and said notice shall direct said owner to proceed immediately to exterminate and destroy said rodents, insects, or other vermin, and to continue in good faith such measures as may be necessary to prevent their return. In the event that said owner fails, refuses, or neglects to proceed as above provided within 10 days from date of receipt of said notice the State board of health may at once proceed to exterminate and destroy said rodents, insects, or other vermin, and take such measures as may be necessary to prevent their return, and the cost of the above measures shall be repaid to the State board of health by the board of supervisors or other governing body of the county, city and county, city, or town wherein the work is done at its next meeting after the bill is presented, and the appropriation provided in section 1 of this act shall be reimbursed by the amount so paid and may be again expended in a similar manner.

Sec. 3. Whenever a board of supervisors or other governing body of any county, city and county, city, or town shall have repaid the State board of health any sum as provided in section 2, the clerk of such board shall file in the office of the county recorder a notice of such payment, claiming a lien on such property for the amount of such payment. Any and all sums so paid by such county, city and county, city, or town shall be a lien on the property on which such rodents, insects, or other vermin shall have been exterminated and destroyed, and may be recovered in an action against such property, which action to foreclose such lien shall be brought within 90 days after such payment, and be prosecuted by the district, city, or town attorney, in the name of such county, city and county, city, or town, and for its benefit. When the property is sold, enough of the proceeds shall be paid into the treasury of such county, city and county, city, or town to satisfy such lien, and the costs and overplus, if any there be, shall be paid to the owner of the property, if known, and if not known shall be paid into the court for the use of such owner when ascertained. When it appears from the complaint in such action that the property on which such lien is to be foreclosed is likely to be removed from the jurisdiction of the court, the court may appoint a receiver to take possession of the property and hold the same while the action may be pending or until the defendant shall execute and file a bond, with sufficient sureties, conditioned for the payment of any judgment that may be received agaimst him in the action and all costs.

Sec. 4. This act, inasmuch as it provides for an appropriation for the usual current expenses of the State, shall, under the provisions of section 1 of Article IV of the constitution of the State of California, take effect immediately.

This act has been examined by competent legal authority, and it is believed that the defects which pertained to the other act do not obtain in the present act, and that if necessary legal measures can be resorted to with a feeling of confidence that the law will be upheld. Under the referendum clause of the constitution of the State of California this law can not take effect until 90 days after the date of signature by the governor, namely, August 10, 1913.

PLAN OF OPERATIONS DURING COMING FISCAL YEAR.

It is understood that the State board of health will adopt a resolution in accordance with the law, outlining the infected area within the State. As soon as this resolution has been adopted, each infected county will be divided into districts of approximately 40,000 acres each, the entire county to be under the supervision of a supervising inspector. Notices will then be served by the field inspectors, as the law provides, and after the 10-day period has elapsed, if measures for squirrel destruction are not begun and continued in good faith, the provisions of the law will be carried out.

Circulars of instructions were sent to supervising inspectors and field inspectors; and they were required to make weekly reports to the central headquarters.

Recapitulation of annual report, 1912–13.

ACRES COVERED.

	Grain.	CS_2 waste ball method.	Destructors.	Total.
By individuals	[1] 1,297,222	[1] 155,893	45,703	1,498,818
By Camp Parkinson (Federal)	67,172		22,846	90,018
By Camp Altamont (Federal)	24,760			24,760
Total	1,389,154	155,893	68,549	1,613,596

COST DATA.

	Pounds used.	Labor.	Cost of labor.	Cost of material.	Total.
By individuals:					
Grain [1]	466,539	13,808	$30,036.79	$45,639.93	$75,676.72
CS_2 waste ball method	65,220	1,195	6,605.40	6,783.35	13,388.75
Destructor CS_2	24,465	634.5	6,870.25	2,488.10	9,358.35
Total		15,637.5	43,512.44	54,911.38	98,423.82

[1] Amounts estimated; accurate data not obtainable.

By cities: Oakland, 1 man, 12 months, at $100 per month		$1,200.00
By counties: Santa Clara, Alameda, Santa Cruz, San Joaquin		7,443.15
By State: Labor, supplies, transportation, miscellaneous		7,885.34
By Federal:		
Field—		
Salaries	$50,532.90	
Livery	7,220.40	
Supplies	2,636.12	
Freight and travel	264.00	
		60,653.42
Headquarters—		
Salaries	9,840.43	
Rentals	1,325.85	
		11,167.28
Grand total		186,773.01

Average cost per acre	$0.1151
Squirrel destructors in all operations	202
Average infestation (squirrels per acre):	
On individual work	9.22
On Federal camp work	7.98

NOTICE.

No. ......

...., *California*, ..., *191*..

....

....

You are hereby notified that the property owned by you in T. .., R. .. S. .., or Grant ...., is infested with rodents (ground squirrels). Inasmuch as .... County has been declared by the State board of health to be an existing focus of contagious or infectious disease, as provided by an act of legislature approved

June 7, 1913, it becomes your duty under said law to proceed to exterminate and destroy said rodents (ground squirrels). It is required that measures of extermination be instituted within 10 days of receipt of this notice.

Respectfully,

State Board of Health,
...., *Secretary.*

Served by ...., *Field Inspector.*
Receipt acknowledged.
...., *Owner.*

WORK OF PLAGUE LABORATORY, SAN FRANCISCO, CAL.

As in previous times, the chief routine duty of this laboratory has been the systematic examination of squirrels, rats, and other animals for plague infection. The rats have been secured from San Francisco and adjoining bay cities, while the squirrels have been sent chiefly from Contra Costa and Alameda Counties, and in a less extent from Santa Clara County and San Benito County, while a few have been received from the counties in San Joaquin Valley. The following are the numbers of animals received, examined, and the numbers of those found infected:

Animals.	Received.	Examined.	Infected.
Rats	127,017	96,005	0
Squirrels	30,453	30,408	680
Other animals	489	483	0

As was mentioned in last annual report, the rate of infection that exists among the squirrels differs widely from time to time and apparently this difference is due to the districts from which these rodents are secured and to a less extent to the time of the year. During the spring and summer months, when a large percentage of these rodents are young, the infection runs high and most of the cases are among these young animals. It must also be borne in mind that this period of high percentage of infection also corresponds, in a general way, to the occurrence of the dry season, which condition is favorable to the increase of fleas.

In addition to this regular work for which the station was created, various other work of an experimental nature has been performed. A number of tests on specimens sent by the marine hospital have been made.

Early last autumn Surg. D. H. Currie, Surg. Long, and Passed Asst. Surg. Simpson, assisted by Attendant Duncan, undertook a series of experiments to ascertain, if possible, some economical, practical, and efficient means of destroying squirrels in their burrows. With this end in view, there was constructed, on the premises of the Federal laboratory an artificial burrow, as near as possible like the natural burrow. In order to make the test more exacting the artificial burrow was made twice as long and with twice the diameter of the average burrow met with in the field. Into this burrow there was introduced many poisonous gases and observations made as to their effects upon guinea pigs and squirrels encaged at the far end of the burrow. All these experiments at first met with very uncertain results, until by an accident it was learned that it was not so much a question of which poisonous gas to use, as it was to get the gas to the far end of the burrow so quickly that it would not be lost by mixture with the ground air in the slow process of natural diffusion between the mouth of the burrow where it was introduced and the far end of the burrow where the animal was encaged. It was learned that in order to get a poisonous dose of the gas to the animal at the far end of the burrow, a pump was required to propel the gas in a reasonably rapid manner. It was only a simple matter to determine that, expense, efficiency, and other factors considered, carbon-bisulphide was the best substance to employ. From then on, it was but a question of mechanics to secure a pump that would accomplish this result in the most effective manner and at the same time be of reasonably light weight, small bulk, and easily handled. With this in view, a number of trial pumps were tested out, all of which were the inventions of the several officers conducting these experiments. The lightest, easiest worked, and most deadly pump was one constructed on the principle of a bellows, but this on trial in the field was found to be too fragile to stand long, practical use, so a plunger pump with metal case was adopted. These pumps have proven in the work in the field to be efficient and practical, and are now made by some commercial firms and sold to ranchers at a reasonable price.

The following is a list of the specimens examined for the marine hospital during the period covered by this report:

Test for Widal's reaction	47
Examination of urine for Diazo reaction	9
Examination of typhoid urine for bacilli	3
Examination of feces of convalescent typhoid patients	78
Miscellaneous blood examinations	6
Examination of excised gall bladder for typhoid bacilli	1
Examination of sputum for B. tuberculosis	11
Analyses of stomach contents	18
Tests of blood sera for Wasserman reaction	185
Complete urinalyses	9
Numerous examinations of Angel Island drinking water for intestinal bacteria.	
Examination of pathological specimens	9

Amendments to Interstate Quarantine Regulations.

COMMON DRINKING CUPS.

[Amendment to interstate quarantine regulations.]

Treasury Department,
Office of the Secretary,
Washington, October 30, 1912.

To medical officers of the Public Health Service, State and local health authorities, and others concerned:

On account of the frequent spread of disease by the use of common drinking cups, the following amendment is hereby made to the Interstate Quarantine Regulations promulgated by this department September 27, 1894, and amended August 17, 1905, June 24, 1909, and May 15, 1912, said amendment and regulations being in accordance with section 3, act of Congress approved February 15, 1893.

Article 3, General Regulations, is hereby amended by the addition of the following paragraph:

"Paragraph 13. Common carriers shall not provide in cars, vehicles, vessels, or conveyances operated in interstate traffic, or in depots, waiting rooms, or other places used by passengers traveling from one State or Territory or the District of Columbia to another State or Territory or the District of Columbia, any drinking cup, glass, or vessel for common use: *Provided,* That this regulation shall not be held to preclude the use of drinking cups, glasses, or vessels which are thoroughly cleansed by washing in boiling water after use by each individual, nor shall it be held to preclude the use of sanitary devices for individual use only."

FRANKLIN MACVEAGH,
Secretary.

COMMON TOWELS.

[Amendment to interstate quarantine regulations.]

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
Washington, December 9, 1912.

To medical officers of the Public Health Service, State and local health authorities, and others concerned:

The following amendment is hereby made to the Interstate Quarantine Regulations promulgated by this department September 27, 1894, and amended August 17, 1905, June 24, 1909, May 15, 1912, and October 30, 1912, said amendment and regulations being in accordance with section 3, act of Congress approved February 15, 1893.

Article 3, General Regulations, is hereby amended by the addition of the following paragraph:

"Paragraph 14. Common carriers shall not provide in cars, vehicles, vessels, or conveyances operated in interstate traffic, or in depots, waiting rooms, or other places used by passengers traveling from one State or Territory or the District of Columbia to another State or Territory or the District of Columbia, any towel for use by more than one person: *Provided.* That towels may be used again after having been sterilized with boiling water."

FRANKLIN MACVEAGH,
Secretary.

WATER AND ICE SUPPLIED BY INTERSTATE CARRIERS.

On January 25, 1913, the Secretary of the Treasury, under authority of an act of Congress approved February 15, 1893, promulgated the following regulation regarding the water and ice furnished to passengers by common carriers in interstate traffic:

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
Washington, January 25, 1913.

To medical officers of the Public Health Service, State and local health authorities, and others concerned:

The following amendment is hereby made to the Interstate Quarantine Regulations promulgated by this department September 27, 1894, and amended August 17, 1905, June 24, 1909, May 15, 1912, October 30, 1912, and December 9, 1912, said amendment and regulations being in accordance with section 3, act of Congress approved February 15, 1893.

Article 3, General Regulations, is hereby amended by the addition of the following paragraph:

"Paragraph 15. Water provided by common carriers on cars, vessels, or vehicles operated in interstate traffic for the use of passengers shall be furnished under the following conditions:

"(*a*) Water shall be certified by the State or municipal health authority within whose jurisdiction it is obtained as incapable of conveying disease: *Provided:* That water in regard to the safety of which a reasonable doubt exists may be used if the same has been treated in such a manner as to render it incapable of conveying disease, and the fact of such treatment is certified by the aforesaid health officer.

"(*b*) Ice used for cooling such water shall be from a source the safety of which is certified by the State or municipal health authority within whose jurisdiction it is obtained, and before the ice is placed in the water, it shall be first carefully washed with water of known saftey, and handled in such manner as to prevent its becoming contaminated by the organisms of infectious or contagious diseases: *Provided,* That the foregoing shall not apply to ice which does not come in contact with the water which is to be cooled.

"(*c*) Water containers shall be cleansed and thoroughly scalded with live steam at least once in each week that they are in operation."

FRANKLIN MACVEAGH,
Secretary.

Many requests have been received from common carriers for instructions as to how the requirements of the regulation can best be fulfilled. Therefore, for the information of those concerned, the following instructions have been drafted:

INSTRUCTIONS RELATIVE TO THE CERTIFICATION OF THE WATER AND ICE FURNISHED TO PASSENGERS IN INTERSTATE TRAFFIC.

Samples of water and artificial ice from each and every source of supply should be subjected to bacteriological and chemical examination at least once in every six months by the proper State or municipal health authority within whose jurisdiction the supply is obtained, or by other person or persons competent to make such examinations and whose results will be accepted by the State or municipal health authority whose duty it is to issue certificates. Each new crop of natural ice should be examined and certified before use.

The common carrier desiring a certificate of the State or municipal health authority within whose jurisdiction the water or ice is obtained, should make application therefor.

After the necessary examinations shall have been made the certificate should be issued on the above form in triplicate, one copy to be delivered to the common carrier, one copy to be forwarded to the Surgeon General, United States Public Health Service, Washington, D. C., and one copy to be retained as a matter of record and for future reference.

Whenever there is an unusual prevalence of typhoid fever, dysentery, infantile diarrhea, or other water-borne disease in a locality from which common carriers receive water and ice, an additional examination of the water and ice should be made and a supplemental certificate made by the proper certifying authority and forwarded as above.

TREASURY DEPARTMENT,

UNITED STATES PUBLIC HEALTH SERVICE.

Certificate of examination of water and ice for passengers in interstate traffic.

This is to certify that the .... supplied
(Water.) (Ice.)
....
(Name of common carrier.)
at ...., for use of passengers in interstate traffic .... been examined and found free from organisms or materials liable to cause disease in man.

Date of examination ....

Signed, ...

Title, ...

Address, ...
....

The enforcement of paragraph 15 of the Interstate Quarantine Regulations has been very successful, and the bulk of the common carriers transporting passengers in interstate traffic have filed with the bureau certificates as to the purity of their water and ice supplies. Many of the railroads have installed water containers in which the ice and water do not come in contact. The sources of water supply have been changed in several instances because of the discovery that the water was not such as to permit of its certification.

The foregoing regulations have met with very general acceptance, and have resulted in a marked improvement in sanitary conditions on interstate carriers.

In order that there might be a standard from which to judge of the purity of water and ice, the Secretary of the Treasury, under date of January 14, 1913, appointed a commission to determine such a standard, consisting of Surg. John F. Anderson, chairman, Hygienic Laboratory; Profs. Wm. T. Sedgwick, Massachusetts Institute of Technology; M. J. Rosenau, Harvard Medical School; E. C. Franklin, Hygienic Laboratory, Washington, D. C.; Geo. M. Whipple, Harvard University; C. E. A. Winslow, College of City of New York; Edward Bartow, University of Illinois; Edwin O. Jordan, University of Chicago; Charles Gilman Hyde, University of California; W. H. Park, University and Bellevue Medical College; C. C. Bass, Tulane University; Drs. Henry Hanson, bacteriologist, Florida State Board of Health; and S. J. Crumbine, secretary, Kansas State Board of Health; Surg. A. J. McLaughlin; and Passed Asst. Surg. W. H. Frost, United States Public Health Service, recorder.

This commission is still at work, but its report is expected at an early date. Upon receipt of this report it will be recommended to the Secretary of the Treasury for promulgation as a part of the Interstate Quarantine Regulations. The effect of this amendment to the Interstate Quarantine Regulations, combined with compliance with department circular No. 49, have brought about a marked improvement in sanitation of trains and vessels.

SANITATION OF TRAINS AND VESSELS.

OFFICERS OF THE UNITED STATES PUBLIC HEALTH SERVICE TO NOTE SANITARY CONDITIONS OF TRAINS, VESSELS, STATIONS, AND WHARVES.

With the approval of the Secretary of the Treasury, the Surgeon General of the United States Public Health Service has issued instructions to commissioned medical officers to make note when traveling of the sanitary conditions of trains, vessels, stations, and wharves and to report the results of their observations. The purpose of this action is to enable the Surgeon General to ascertain existing sanitary conditions of common carriers engaged in interstate traffic. The circular of instruction follows:

Inspection of sanitary features in operation of railroad trains in interstate commerce.

TREASURY DEPARTMENT,
BUREAU OF PUBLIC HEALTH SERVICE,
Washington, October 5, 1912.

1912.
Department Circular No. 49.

To commissioned medical officers, Public Health Service:

Hereafter all commissioned medical officers of the Public Health Service, when traveling under official orders on trains and vessels engaged in interstate traffic. will make such observations as may be practicable of the sanitary conditions of the trains and vessels on which they travel and the stations and wharves at which they stop. The results of these observations will be noted in a report to be submitted to the bureau upon completion of the travel authorized. This letter does not authorize officers to conduct formal inspections or to give instructions or offer advice to employees of common carriers. The making of the observations mentioned is desired solely for the information of the bureau and for the compilation of facts relative to the sanitary conditions prevailing in interstate traffic.

RUPERT BLUE, *Surgeon General.*

Approved:
FRANKLIN MACVEAGH,
Secretary of the Treasury.

Under the foregoing, reports have been received from all officers traveling on interstate carriers on official duty. In each instance, when an adverse report has been made, the common carrier has been notified and requested to remedy the conditions. This request has been readily complied with in most instances.

OUTBREAK AND SUPPRESSION OF PLAGUE IN PORTO RICO.

As noted in annual report for 1912, the bureau was notified on June 17, 1912, of the presence of bubonic plague in San Juan, Porto Rico.

Passed Asst. Surgs. R. H. Creel, C. W. Chapin, and J. R. Ridlon, and Asst. Surg. C. L. Williams, were ordered to Porto Rico for the purpose of suppressing the epidemic. This work has been accomplished, and these officers will be withdrawn very shortly.

The following report on the outbreak and its suppression is given in considerable detail in order that it may be readily available to persons who may have reason to desire such information in the future:

SUMMARY.

There were 55 cases of human plague in the Porto Rico epidemic, 10 having occurred at the date of announcement of the disease and 45 thereafter. All were of the bubonic type, with a mortality of 65 per cent.

Flea infestation in Porto Rico is very low compared with other tropical countries. The data is not sufficient to determine if there is a seasonal variation. The species of fleas encountered on rodents were: *Xenopsylla cheopis*, *Echidnaphaga gallinacae*, *Ctenocephalus canis*, and *Pulex irritans*, with the addition of *Rhynchoprion penetrans* on human host. The infectation of rats by chicken flea in San Juan is noteworthy. The decline in rat population, as indicated by the weekly catch, was marked and to a large degree was the result of rat proofing. The rat infection extended to four points outside of San Juan: To Carolina, a distance of 14 miles; Caguas, 23 miles; Arecibo, about 50 miles, and Rio Piedras, 3 miles. Only in the first-named village did human cases occur.

The presumptive evidence points to an extension by infected rats in merchandise. The infection in Rio Piedras might have been carried there by migratory rodents.

In Porto Rico the Mus norvegicus, Mus alexandrinus, and Mus rattus infest houses, but the former predominates. Mus alexandrinus is the species found in rural districts. Sufficient data are not at hand as to the variation of breeding, but it is probable that there is no seasonal fluctuation of this nature among the rodents of Porto Rico.

GENERAL CONSIDERATIONS.

Inception of rat epizootic.—Plague was determined present in San Juan on June 19, 1912, at which time 13 human cases or more had actually occurred. That there had been for several weeks previous a rodent infection seems highly probable, not only from the well-known precedence of human infection by rat epizootic, but by the results of inquiries in San Juan as to the evidence of a previous rat epizootic. From reliable sources of information it developed that a marked and unexplainable mortality among rats along the water-front district was noticed as early as the latter part of April or the first part of May. An inspector in the customs warehouse reported that at the above-mentioned period he had noticed several dead rats each morning upon opening up the warehouse. He was especially impressed because the mortality could not be accounted for, no poison having been distributed. A similar recital was elicited from other warehouse men. This observation of rodent epizootic, it is to be noted, was made in warehouses receiving foreign shipments.

Duration of infection in San Juan.—From the time service eradicative measures were inaugurated until the last plague rat was captured in San Juan, there elapsed a period of 67 days, or 84 days from the official declaration of plague. The decline and cessation of infection can be ascribed only to the marked reduction of rats with their plague-carrying parasites. This result, while immediately due to trapping and poisoning, was very largely dependent upon the thorough rat-proofing measures instituted. Rat proofing not only deprives the rodent of an abode—a place to live and breed—but it removes from him his food supply. In urgent need of new quarters and food, the dispossessed rodent, provided he has escaped death from the hands of workmen, falls a prey to poison or traps. It is thought that the most potent factor in the decline of fleas was the destruction of these parasites in the measures incident to rat proofing. When a food depot was rat proofed, rat runs were securely sealed in by the concrete, and the fleas therein were thus destroyed. The widespread use of petroleum likewise caused a diminution in their numbers.

General destruction of property as antiplague measure not rational.—In the first days of the epidemic there was a widespread belief that Puerta de Tierra should be burned. The result of this procedure would not have been more effective in preventing plague than was rat proofing. There would have been left homeless several thousand people, and aside from the question of property rights and legal involvements there would have been destroyed several million dollars of property that otherwise has been saved. The contention that many unsightly houses would have been destroyed by a general conflagration and replaced thereafter by better-appearing construction should not enter into general sanitary considerations. Some stress is laid on this subject as an argument against general destructive measures which have no place in practical sanitation.

General insanitary conditions not productive of plague.—In Porto Rico, as was noted in India, general insanitary conditions did not seem to be a factor influencing in any way the incidence of human cases. The most squalid part of Puerta de Tierra, a section located on the seashore, where from the nature of the swampy ground the houses had been built more or less elevated, was especially free from human cases. From a superficial viewpoint one would have expected this section of congested shanties and indescribable squalor to have suffered heavily from the ravages of the disease. The swampy nature of the ground, which is more or less inundated by the daily tides (which necessitated an elevated construction), operated for the salvation of these people. The better part of Puerta de Tierra was the section that had the majority of cases. The whole of Puerta de Tierra, however, despite its present unsightly and general insanitary condition, is to-day the district of San Juan most free of rats, and, consequently the best part of the municipality, from a plague standpoint. Of the 1,127 buildings, all are either elevated 2 feet with underpinning free or have a concrete floor and side walls. The marked dimunition in rat population could have been secured in no other way than by rat proofing, as it is impossible to prevent the people residing there from throwing more or less foodstuffs about the streets and lots.

INCEPTION OF THE EPIDEMIC.

The first suspicious case examined was that of a patient, on June 15, in the district of San Juan, known as Puerta de Tierra. The necropsy revealed a "double pneumonia in stage of red hepatization with left axillary bubo." Smears from the tissues and exudate of the cadaver were made and studied jointly by Dr. Gonzáles Martínez, bacteriologist of the insular department of sanitation, and Dr. F. J. Hernández, assistant bacteriologist, with Surg. S. B. Grubbs, of the United States Public Health Service, in conference. A bacillus was observed showing bipolar tinctorial peculiarity when stained. Some stress was laid on the fact that it was gram negative, nonmotile when observed in hanging drops of fluid exudate, and that it appeared bipolar when stained.

Between June 15 and June 19 other similar cases occurred and the bacteriological studies continued. A guinea pig was injected intraperitoneally with the exudate from the preitoneal cavity of a suspected case. The animal died of a mixed infection, but smears made from tissues and exudates showed large numbers of bipolar bacilli. The organism was not isolated in pure culture nor Koch's postulates for its identification carried out; but the fact that it was constantly observed in the suspicious cases examined, together with the marked clinical symptoms and increasing number of cases, justified the diagnosis of plague.

On June 19 plague was officially declared present in San Juan, and the acting governor requested by cable the services of an officer of the United States Public Health Service experienced in plague work. The insular authorities, especially the acting governor, Mr. M. Drew Carrel, and the acting director of sanitation, Dr. W. R. Watson, as soon as the diagnosis of plague was determined, acted with a decision and honesty of purpose seldom seen in the inception of plague epidemics, and with rare frankness a proclamation was promptly issued making public the presence of the infection not only to the people of San Juan but to all the world.

In accordance with the request of the acting governor that a service officer experienced in plague be sent to Porto Rico, Passed Asst. Surg. R. H. Creel was ordered on June 20 to sail from New York, and arrived in San Juan June 27. Asst. Surg. C. L.

Williams sailed on the same boat. From that date to the time when the service assumed charge of plague suppressive measures, Dr. Creel was associated in an advisory capacity with the director of sanitation.

On June 30 it was agreed, at a conference with the acting governor, Mr. M. Drew Carrel; the director of sanitation, Dr. W. F. Lippitt; and Surg. S. B. Grubbs, that all work pertaining to the eradication of plague would be turned over to the United States Public Health Service. At this conference it was proposed that the work of the Public Health Service should embrace the purely eradicative activities, and that the insular department of sanitation should attend to the hospitalization of cases; the maintenance of isolation and detention camps; the furnishing of office and laboratory buildings necessary for the service operations, and all unexpendable supplies; the collection and disposal of garbage, and the inspection of suspicious dead. The necropsy of suspicious cases was to be done jointly by the local department and the service, the bacteriological procedure being carried out in the service laboratory.

In addition to suppressive measures, the maintenance of detention camps and the hospitalization of cases were later turned over to the service.

ORGANIZATION OF WORK.

The service plan of operation decided upon embraced the following: (1) The quickest possible rat proofing of the whole city; (2) the thorough supervision of inland-bound freight, that no rodents should escape from San Juan in packages of merchandise; (3) a special force of men for widespread trapping and poisoning; (4) a laboratory force to examine all captured rodents; (5) the tagging of all rats collected so that the location of any infected rodent would be known and the progress of infection mapped out; and (6) the sulphur fumigation (in conjunction with intensive rat proofing) of all infected premises. Disinfection was not utilized, being considered not pertinent to antiplague measures in absence of the pneumonic type, aside from involving a waste of time and money. In its stead, however, flea-destruction measures were observed. Sulphur fumigation and petroleum spray were the agents employed for this purpose.

This plan followed along the lines of the service organization employed in San Francisco during 1907, which was attended by such satisfactory results. Such modifications were made as local conditions required. It was recognized that merely to confine measures to individual foci of infection would not arrest the march of infection and would be inoperative to any early termination of cases, either rodent or human; and that while both human and rodent foci merited immediate treatment, more especially the latter, eradicative measures should be equally vigorous in the sections of the city that were as yet free from infection.

The week following June 30, the date of the conference at which the service was requested to take charge of plague work, was devoted to securing a force of competent employees and providing an effective rat-proofing ordinance. Due to the interested cooperation of the director of sanitation, the organization was greatly facilitated by the acquisition of a number of men who had proven their worth in the local department and were given indefinite leave to work with the service.

Some time previously a tentative rat-proofing law had been drafted by the insular board of health. To this was added at suggestion of the service representative a section for rat proofing of buildings already constructed; dwellings to be elevated 2 feet, with underpinning free, or to be surrounded at their perimeter by concrete wall extending 2 feet below the surface of the ground and fitting flush to the floor of the house; the requirements for the rat proofing of any place that kept provisions, such as groceries, bakeries, markets, etc., by concrete floors and walls, the latter extending 2 feet below the ground level and 1 foot above the floor level; a rat-proofing section for stables and a section for rat proofing chicken pens. Likewise the section for rat proofing of future constructions was changed, giving specific requirements for elevation with free underpinning or requiring concrete floor and walls. The operation of this law will be referred to in another paragraph.

Proper blank form was provided by the attorney general with the paragraph containing penalty for violation thereof printed on the reverse side. Three thousand traps of a picked pattern were cabled for—1,500 cage and 1,500 snap traps. This number was augmented by a similar number in the latter part of July, and again in August, so that 9,000 traps were used throughout the island. A suitable building was secured as an office, and blank forms for inspection reports, laboratory reports, rat reports, etc., were devised.

In response to a cable request Asst. Surg. J. R. Ridlon and Pharmacist F. L. Brown were ordered to San Juan for duty in connection with plague-suppression measures.

A special laboratory for the examination of rodents had been put in operation on June 30 by Maj. F. F. Russell, of the United States Army. The building was well isolated and admirably located for this work and had been selected in the latter part of June by Surg. S. B. Grubbs and Dr. W. F. Lippitt. Upon his arrival, Asst. Surg. Ridlon was placed in charge of this laboratory, assisted by Acting Asst. Surg. F. J. Hernández. On August 26 Asst. Surg. Ridlon was ordered to take charge of the service operation in Mayaguez. He was succeeded in the laboratory by Passed Asst. Surg. C. W. Chapin, who had been ordered to San Juan by the bureau for that purpose. Arrangements were made with the department of sanitation for the preparation in the department laboratory of arsenic and phosphorus poison.

Thus in the second week of July an organization fully equipped for the eradication of plague was set to work.

Due to the excellent preliminary work performed by the local sanitary department it was possible to institute at once the eradicative measures of rat proofing, widespread trapping and poisoning, and inspection of outgoing freight.

Disinfection was not employed, being considered a waste of time and money. All outbound freight was either unpacked and examined or treated by sulphur fumigation in an especially constructed sulphur chamber. The disinfection of personnel was ignored as not being pertinent to antiplague measures.

The destruction of buildings was considered as unjustifiable in a general way, unless done by the owner in preference to rat proofing. There were a few exceptions to this policy, notably one infected house in Carolina, the thick adobe walls of which were riddled with rat runs. The immediate destruction of rat harborage on any premises on which a plague-infected rodent was taken was considered of paramount importance, considerably more so, in fact, than the treatment of buildings in which human cases occurred, though both contingencies were considered as meriting prompt action.

On removing flooring the space beneath was drenched with petroleum. The Haffkinization of the population was not undertaken by the service, inasmuch as the value of this procedure has not been sufficiently demonstrated to justify the expenditure of labor and money when more effective measures are available. The work done by the service can best be described under the headings of "Rat proofing," "Rat trapping and poisoning," "Freight inspection," "Laboratory examination of rats," and "House inspection for enforcement of garbage disposal and the maintenance of premises free of rat harbors."

RAT PROOFING.

The city of San Juan, with its barrios of Santurce, Puerta de Tierra, and those parts of the town known as La Marina and La Perla were divided into eight districts, and an inspector was assigned to each one. Owing to the inexperience of these men, special instruction and field demonstration were necessary in the earlier days of the work. In this way the service representative personally inspected and indicated structural changes, when necessary, for rat proofing of all buildings in Puerta de Tierra, the Marina, La Perla, and a great many in the old city and in Santurce. Similar instructions were given to the assistant sanitary engineer of the insular department who, later on, attended to the rat-proofing procedure for the inland towns.

Old city.—In addition to the eight inspectors, two men were employed as special inspectors to supervise the rat proofing of the old city where predominated the type of construction locally known as "mamposteria" and similar in type to the well-known adobe material. Both were long experienced in structural work, and one was a graduate engineer. After receiving instructions as to their specific duties, both of these men, Mr. Eugene Chase and Mr. Martin Paniagua, did most excellent work, as indeed did all the other inspectors except two or three who were discharged for incompetency. Aside from containing a type of building that, because of its soft adobe walls, furnished harborage for rats on a large scale, the old city contained the docks, warehouses, and the majority of the large groceries and markets. San Juan, being the main port and the big distributing point for the island, contains warehouses and large storehouses of provisions greatly in excess of its urban population. It has two or three times the number of these places usually seen in cities having the population of San Juan, which is estimated to be 50,000.

The question of rat proofing the mamposteria construction was a serious problem. Though this construction is somewhat different from the "pukka" houses in India, the description of buildings in Bombay by the Indian Plague Commission, both as to the nature of the material and the degree of rat infestation, makes the similarity of construction in Bombay and San Juan very striking. In one building of this material two cases of plague acquired their infection, and, on destroying the walls, which were 2 or 3 feet thick, nine rats were taken from their interior. The necessity, therefore, for rat proofing this kind of building was imperative.

An expedient, however, was adopted that made the majority of mamposteria structures comparatively rat proof. This embraced the requirement of a concrete floor, in all places that contained provisions, with a 4-inch capping on the soft walls extending 2 feet into the ground and upward above the floor level. For warehouses and wholesale groceries, this capping extended upward 4 feet. For smaller groceries, restaurants, and similar places where the walls were always exposed to view, the facing was required to be of only 1 foot in height. In this way, should a rat escape from a hole above the capping and descend to the floor it could not regain its former abode. Likewise, any rat hole well up from the floor level could be easily seen and closed, whereas lower down it might escape notice. The heavy facing also protected the walls at the lower points where heavy articles of merchandise would most frequently break a veneer of cement or lime mortar and give entrance to a rodent.

This capping provoked some opposition. Many of the people could not understand that mere breadth of the wall was no bar to ingress of rodents, but on the contrary furnished increased rat harborage. The very evidence of rat holes seldom seemed to offset the argument that the walls had withstood earthquake shocks and the onslaught of time, and consequently ought to exclude rats. With few exceptions, however, the majority of owners obeyed instructions for rat proofing with alacrity and good will.

This district includes the docks, the large warehouses, and some dwellings. It lies along the water front. The San Juan docks are known as Pier 1, Pier 2, "Old Quartermaster's Dock," and San Antonio Dock.

The two former are constructed as piers. The outer end, where ships lie alongside and discharge cargo, has reenforced concrete floor, protected by galvanized-iron roof and walls. At the end adjoining the shore are located the offices, extending the width of the dock on each side of the entrance. In making these two docks rat proof the doors were so repaired as to fit tightly and were required to be closed at night. The wooden floors of the offices were replaced by concrete, and the double walls were rat proofed by concrete filling at the bottom and heavy timbers at the top. The side of the dock connected with the land was made impervious to the passage of rats by increasing the depth of the walls by a 2-foot concrete foundation. At the juncture of the dock with the land a V-shaped piece of sheet iron extended outward over the water on both sides of the dock, so that a rat could not gain access to the dock by running along the sides. In addition to this the dock space was required to be cleared of all cargo once a week.

The San Antonio Dock presented a different problem. It comprised a very large area of newly made land that, constantly settling, prevented the laying of any concrete floors. It had a galvanized-iron roof and walls, with the bare earth as floor. This place was rat proofed by a marginal wall of concrete on all sides. On the interior the floor space was divided into some 16 compartments, separated by galvanized-iron partitions sunk 2 feet into the ground and extending upward 4 feet. One compartment is required to be cleared of cargo once in two weeks. At such times the transfer of cargo is effected between sunrise and sunset, so that any rats, if present, penned in by the iron walls can not escape, and are caught and killed. This procedure serves not only to catch any rodents that are present, but is an ever-present indication of the degree of rat population in that place.

The old Quartermaster's Dock has been partly abandoned, being chiefly used in the sugar season when ships come alongside to be loaded with that commodity. Being in disuse in July, the entire plank flooring was removed, leaving the bare ground. Subsequently the railroad company built concrete walls and floor.

All warehouses in the Marina were compelled to put in concrete floor and walls; indeed, on account of the proximity to the docks and the water front, all buildings in this district, whether warehouses and stores, markets or dwellings, were required to have concrete floor and walls.

La Perla.—This collection of small hovels was situated below the walls of the old city near the municipal slaughterhouse. Five cases of plague occurred there. With the exception of two or three food depots, rat proofing was accomplished by elevation. The food depots were treated as elsewhere.

TABLE I.—*San Juan (old city), La Perla, and La Marina.*

Food depots	203
Piers and wharves	4
Dwellings	735
Stores and buildings of miscellaneous nature	125
Stables	8
Total buildings	1,075

Rat proofed:	
Food depots	183
Piers and wharves	4
Dwellings	706
Stores and buildings of miscellaneous nature	10
Stables	8
In process of compliance	33
Noncompliant	132

NOTE.—Of the amount spent on rat proofing in the old city, $100,000 represents reconstructions on a large scale, far exceeding in magnitude the rat-proofing repairs ordered, though embracing them.

Puerta de Tierra.—This barrio of the municipality is separated from the old city by a quarter of a mile of unbuilt-upon land except for one or two buildings belonging to the railroad company. For the most part this district is populated by a class of people totally indifferent to every law of hygiene. They live, as a rule, in squalor, and the premises, even at this date, are with difficulty kept free from garbage. Before the epidemic this was not attempted. Frame dwellings prevail in Puerta de Tierra, though there are three or four brick buildings, and since the rat proofing has been in progress several concrete structures have been erected.

This section can be divided for purposes of description into the northern and southern part. The former stretches along the municipal highway known as the Carretera and along San Agustin Street. Practically all cases in Puerta de Tierra were along San Agustin Street. The congestion of houses in Puerta de Tierra is very great and frame tenements abound. Facing San Agustin the majority of buildings are food depots. These were required to have concrete floors and walls.

On the first appearance of the epidemic, employees of the police and sanitary departments destroyed 50 houses. What made house raising difficult in the early days of the epidemic was the fact that there were practically no jacks in San Juan. In July, the Porto Rico Railway, Light & Power Co. loaned a few jacks to this office, and these were turned over to the poor people in these subbarrios, who raised their own houses. Altogether, there were 441 houses raised in this manner.

Most of the stables were located in Puerta de Tierra. These structures in Porto Rico consist only of the floor and the roof, with supporting timbers, so it was not practicable to make them inaccessible to rodents. They were required, however, to have a concrete floor protected by side walls 2 feet in depth, the crib to stand well removed from all uprights, with a flare from below upward and covered on the outer side by galvanized iron. All grain was required to be kept in rat-proof boxes or houses.

It may be stated that in Porto Rico stables were found not to be the rat harbors they are in San Francisco, possibly for the reason that grass is chiefly used as feed, with very little grain.

In Puerta de Tierra the worst rat harbors, especially the food depots and many of the dwellings, were completely rat proofed by the latter part of July and early August. This work was practically all finished and Puerta de Tierra rat proof in September, though many small items of the work and repairs were not completed until November.

The insular sanitation service maintained a special force of men in Puerto de Tierra, who kept the streets and premises clean of refuse and garbage, a very great help to the rat-trapping force. In all Puerta de Tierra there were 1,127 buildings; 848 of these were rat proofed, the others no requiring such measures.

Table II gives classification of buildings, with nature and cost of same:

TABLE II.

Food depots	69
Dwellings	1,006
Stables	44
Miscellaneous buildings	8
Total number of buildings in Puerta de Tierra	1,127
Rat proofed:	
Food depots, concrete floor and walls	69
Dwellings—	
By concrete walls	170
By elevation	507
Stables rat proofed or destroyed by owner	44

Rat proofed—Continued.	
Miscellaneous	8
Shacks destroyed by insular government	50
	848
Dwellings considered rat proof by reason of elevated construction	379
Total (cost $80,487.27)	1,127

SANTURCE.

With the exception of several small subbarrios, Santurce is the better residence part of the city. It contains comparatively few food depots such as groceries, markets, bakeries, etc., and the dwellings are well kept, the householders keeping their premises clean and free from garbage and refuse. Fourteen cases of human plague developed in Santurce, and 12 infected rats were caught. Subbarrios Gandul, Alto del Cabro, Minilla, Melilla, and Campo Alegre contain many small shacks similar to those in south Puerta de Tierra. Fortunately in these places the ground was very marshy or sandy—a light shifting sand that prevents the rodents from burrowing. Both of these factors made for low rat population, with the subsequent facilitation of plague eradicative measures.

Table III gives classification of buildings, rat-proofing procedure, and cost. In the outskirts of Santurce were several districts known as Machuchal, Chicharo, and Seboruco. There were a number of shacks in these parts without floors and with thatched roofs. As much for general sanitation as for plague considerations, the owners were required to replace the straw roof by galvanized iron and build an elevated floor. About 100 of these structures were so treated.

TABLE III.

Food depots	142
Dwellings	2,961
Stables	28
Miscellaneous buildings	39
Total number of buildings in Santurce	3,170
Rat proofed:	
Food depots, concrete floor and walls	142
Dwellings—	
By concrete walls	219
By elevation	622
Stables rat proofed or destroyed by owner	28
Miscellaneous	39
Total (cost, $57,713.57)	1,050
Dwellings considered rat proof by reason of an elevated construction	1,869
Noncompliant (dwellings)	251
Total	3,170

NOTE.—The 251 dwellings listed "noncompliant" were so recorded because they had less elevation than that required by the rat-proofing law. Most of them had some elevation, and very few furnish potential rat harborage.

RAT PROOFING PUBLIC BUILDINGS.

The rat proofing of public buildings was given the same attention as private property. The interested cooperation of the different insular and Federal Government officials served to effect the rat proofing of most of the Government constructions where the procedure was needed.

Under the direction of the collector of customs the customs service expended $3,092.84 in making the San Juan customs warehouses and property rat proof. Authorization was obtained from the Treasury Department for the expenditure of $10,380.71 in rat-proofing property of the customs service in Ponce, Mayaguez, and the other Porto Rican ports.

The War Department authorized rat-proofing work, chiefly in the nature of concrete stables, to the amount of $5,000 exclusive of the labor involved.

By reason of the active interest of the Governor of Porto Rico, the insular Government expended $7,758.48 on rat-proofing work. The repairs to several Government buildings are still pending because of the expected transfer of authority from the Federal to the insular Government.

The rat proofing of several parts of the old fortification walls around San Juan has been the cause of more or less correspondence between San Juan and Washington. It is probable that the work will eventually be done.

LEGAL PROCEDURES.

While the great majority of people complied with the rat-proofing requirements as soon as ordered, it was necessary to refer some cases to court. As usual, these transgressors were chiefly among the landlord class, the ones who could best afford the expenditure.

Some of the defendants were fined, the amounts varying from $10 to $100; others discharged by request because of having complied before trial.

The city and district courts of Porto Rico, on account of the vigor with which the judges administered the law, gave very great aid to service operations, and the rat-proofing work was greatly expedited by the efficient and energetic way the cases were prosecuted by the attorney general and his assistants.

In all, 166 cases were referred to court with satisfactory results.

INSPECTION OF INLAND-BOUND FREIGHT.

Inspectors were stationed at various points in San Juan, so that all merchandise bound for interior points of the island could be inspected and examined or fumigated. These inspection stations were at the railroad freight warehouses, the docks, the ferry station, the express office, and the exit of the highway from San Juan. All articles that could harbor a rat were either unpacked or were subjected to a sulphur fumigation. This last-named procedure was practiced exclusively at the railroad warehouse, where a large sulphur fumigation chamber was built.

All cars leaving San Juan were inspected and required to be rat proof before being used. All dead spaces such as existed between double planking were made tight and inaccessible to rodents. Breaks in car floors or in the side walls were repaired, and windows were made rat proof. All cars when loaded, or if partially loaded and left standing on track over night, were sealed by an inspector. Because of the difficulty in obtaining reliable employees for this inspection work, and the urgency of seeing that different branches of the organization effectively performed their duties, one point at which supervision should have been instituted without loss of time was neglected. The inspector for cars at the San Antonio Dock and surrounding freight yard was not put on duty till July 15. This unfortunate omission may have been responsible for the infection of the Dorado case and the transportation of plague infection to Arecibo. The facts bearing on this possibility will be referred to later on.

This supervision of freight was discontinued December 1. Altogether 57 rodents were taken from merchandise. Those that were probably killed by fumigation and remained within the packages might have increased the sum total.

To estimate the efficiency of this inspection, the director of sanitation was requested, in October, to make inquiry of the different island health officers as to rodent infestation of freight coming from San Juan. Though several replies stated that rodents had been observed in freight and in cars from San Juan before and during the first days of the epidemic, none had been seen since initiation of inspection. The notice of rats escaping from cars in the first part of the epidemic was mentioned with some emphasis in the town of Caguas. The total number of pieces of freight inspected up to December 1 was 397,708. This embraced those that were repacked by the inspection force. The number of cars inspected was 2,683; number of pieces of freight fumigated, 15,620.

TABLE IV.

Rodents taken from merchandise	57
Cars inspected	2,683
Oxcarts carrying inland-bound freight inspected	6,075
Pieces of freight fumigated	15,620
Pieces of freight inspected (including those repacked)	397,708

TRAPPING AND POISONING OF RODENTS.

As soon as the service plan of organization was decided upon, it was ascertained that the local market at most could supply but slightly over 100 traps. A cable order was sent to the States for 1,500 snap traps and 1,500 cage traps of a selected pattern. In the meantime the entire local supply was purchased. In all, about 2,500 traps were assigned to San Juan, it being considered that each trapper could attend to 60 traps. Later on this number was increased to 9,000 traps. Four or five thousand were sent to different points outside of San Juan.

The method of trapping did not differ from service methods used in San Francisco. For this part of eradicative work the municipality was divided into 10 districts, one foreman and four men being assigned to each. Later on, as rats became scarce, additional foremen were employed, one foreman to two trappers. Each trapper was paid a bounty for each rat caught in addition to his salary. In certain parts of the estuaries bordering on Puerta de Tierra and Santurce rats make nests, live and breed, in the swamp shrubbery known as the "mangle." When the tide recedes the rats make widespread excursions in search of food, returning to their nests, or the branches of the shrubbery, when the tide is flooding. To destroy these rats, not only were traps and poison used, but some of the employees also used rifles, going out in boats at high tide. Where possible the shrubbery was cut down.

In the first week of July in the entire city 72 rats were captured, a daily catch of about 10; in the second week, 294, a daily average of 42. The number increased daily up to the latter part of July, when on July 28 the maximum catch was attained—178 rodents. A diminution in the rat catch commenced the first week in August and continued steadily, so that in September it had dropped to about half; in October and November it had fallen to one-fifth, the daily average for the week November 1 to 7 being 28. The lowering of the rat population was effected by the combined rat catching and poisoning, the success of which was due to rat proofing. The steady decrease in captured rodents was most marked in Puerta de Tierra, where earliest and most careful attention was given to rat proofing. A separate record for each district was not commenced until July 10. In the week July 10 to 16, 95 rats were trapped in Puerta de Tierra. During the last week in July the catch for this district was 205.

On September 11, when the rat catch in Puerta de Tierra had fallen to 22 per cent of the July maximum, the last two infected rodents were trapped in that barrio. This decrease is all the more accentuated by the fact that the trappers were week by week becoming more experienced, the number of foremen in September being doubled so that the supervision was more strict, and the rat bounty was increased from 5 to 10 cents, with an offer of $1 for any infected rat taken. All these factors would naturally operate to case an increase in the number of rats trapped, so that from a comparative estimate it would seem that the percentage of reduction was really greater than is indicated by the actual number of rodents caught.

The last case of plague in the municipality occurred on September 13, when the daily rat catch in the entire city had fallen to 50 per cent of the earlier maximum catch. Between the early morning hours, when the trappers turned in their catch, and the afternoon hours, when the traps were baited, the men distributed poison. Arsenic and phosphorus poisons made in the insular chemical laboratory were used. Six hundred pounds of poison were thus distributed between July 1 and January 1.

Passed Asst. Surg. R. H. Creel, who was in charge of plague suppressive measures in Porto Rico, submits the following report:

ERADICATIVE MEASURES OUTSIDE OF SAN JUAN.

Carolina.—In the latter part of June human plague cases occurred in the town of Carolina, a small village about 14 miles from San Juan.

On June 26 a case, clinically positive, was reported. The patient died on June 27. On June 28 another death from plague occurred in the barrio of Loiza, some 3 or 4 miles distant from Carolina, on the side of town opposite from San Juan. The residence in which he had developed symptoms and died was a small shack out on the hills, well elevated and far removed from other habitations. Investigation revealed the fact that the man had been in Carolina overnight on June 22 and had slept in a house where subsequently "case 3, Carolina," developed its infection. This case was confirmed by animal inoculation July 5. The third and last case of plague in Carolina sickened July 16, died on July 18, and was bacteriologically confirmed on July 18. In all, 7 infected rats were taken from Carolina out of a total 350 examined.

The local health officer in Carolina, pursuant to orders from the director of sanitation, immediately attended to the mechanical cleaning of the town, removal of rubbish, etc. On July 4, Asst. Surg. C. L. Williams was ordered to Carolina. Dr. Pedro Malaret, of the insular department of sanitation, was in joint control with Dr. Williams until July 12, when he left for work in Rio Piedras. The work instituted at Carolina consisted in summary destruction of rat harborage, and in rat proofing, with the incidental capture of all rodents possible. Mr. Walter St. Elmo, of the insular police, ably assisted in all the work at Carolina.

It is highly probable that the infection was transmitted to Carolina from San Juan by means of rats in merchandise. This assumption is supported by the following: The distance of Carolina from San Juan and the appearance of human and rodent plague in Carolina so soon after the discovery of the infection in San Juan; the first patient attacked had not been out of Carolina, but worked in a warehouse handling merchandise from San Juan; no known infection had occurred at intervening points.

Dorado.—On July 13 a suspicious death was reported from the town of Dorado, distant from San Juan about 15 miles. The post-mortem examination established a diagnosis which was confirmed by animal inoculation July 17.

The town is quite small, being a mere group of houses. An insular health official was sent to Dorado to institute antiplague measures at that place. Some 10 rodents were captured and examined without discovering any infection among them. The case, a boy of 13 years, was accustomed to frequent the vicinity of the depot. He is said to have stolen a ride on a freight train from Dorado to Camuy on July 11.

Caguas.—A force of service rat trappers was put to work in Caguas in early August. Rodents from this place were examined in the service laboratory at the rate of about 100 per week.

On September 23 an infected Mus norvegicus was trapped, diagnosed on September 24, and verified by animal inoculation. On October 14 a second Mus norvegicus was taken in the opposite side of the town, a third on December 9, and again on December 21 a fourth was trapped. No human cases so far as is known occurred in this town. Caguas is located on the highway leading south from San Juan, about 23 miles distant.

When the first plague rat was caught, some 50 men were at once employed to summarily destroy all rat harborage in the block in which the plague rodent was trapped, as well as the four contiguous blocks. The tile roofing and the floors of all buildings close to the ground were removed. The earth beneath all houses was drenched with petroleum as soon as flooring was removed. Fifty rodents were captured from the plague block, including 15 from the same house that the infected rat came from. One-third of these rodents were taken from the roofs. The force of rat trappers and poisoners was doubled, and part of the office and field force was transferred from San Juan to Caguas. No other infected rat being discovered for two or three weeks, the work of rat proofing and rat poisoning assumed a more leisurely rate of progress.

The means by which infection reached Caguas is of interest, but it can be only speculation as to whether it was due to the transfer of an infected rat from San Juan in railroad freight or a land extension along the highway.

An infected rat was taken from Rio Piedras on July 12. This village is about 3 miles from San Juan on the road to Caguas. The rodent was picked up dead in the street, and as no other rodent infection was thereafter discovered in Rio Piedras and no human cases occurred, it is not beyond reason that it might have been a solitary migratory rat. A survey of the Rio Piedras-Caguas turnpike in the latter part of September elicited statements to the effect that there had been a noticeable mortality among the rats at several intermediate points two or three weeks prior to the discovery of the first infected rat in Caguas, but nothing more tangible pointing to a rural spread of the infection was discovered.

Arecibo.—Among the rodents examined at the laboratory on October 12 a suspicious Mus norvegicus was discovered and was proved to be positive for plague by animal inoculation on October 15. On October 26 another plague-infected Mus norvegicus was taken from Arecibo.

Arecibo is a seaboard town located in the northwestern part of the island about 80 kilometers from San Juan. It is the fourth city in population in Porto Rico, having about 15,000 people, and is a clean, well ordered town, with considerable municipal pride. In general the sanitary conditions were good, but there was one district on the water front composed chiefly of shacks, badly crowded together, without sewage or garbage disposal. Being on a slope, however, there was no rat harborage on a large scale, but the squalid habits of the people made for more or less rat infestation by furnishing an abundant food supply. In the better sections of the town there were quite a large number of rat harbors in the way of food depots and dwellings. So far as is known no human cases occurred in this town either before or after the infected rats were discovered. As soon as the focus was discovered, the rat-trapping force in Arecibo was increased and rat-proofing measures were at once initiated by the insular department of sanitation.

The means by which infection reached Arecibo was probably infected rodents in merchandise from San Juan. The infection of the Dorado case on July 8 bears rather strongly on this assumption. The large number of intervening points which remained free from infection precludes the possibility of an overland extension.

EXTENSION OF SERVICE OPERATIONS TO NONINFECTED POINTS.

Bearing in mind the possibility of unknown rural spread of infection among the rodents of Porto Rico, it was decided in early August to extend service operations to other points in the island. Bureau authorization for this increased function was requested and granted, the amount of service funds available for this extension of work being increased from $5,000 per month to $7,500 per month, exclusive of the amount spent in connection with quarantine. A rat-trapping force was sent to Carolina, Rio Piedras, and Caguas Later on trapping was started in Arecibo, Bayamon, Manati, and Aguadilla.

LABORATORY.

As has been stated before, the laboratory building was well isolated and admirably adapted for the purpose, having been selected by the director of sanitation and Surg. S. B. Grubbs. Maj. F. F. Russel equipped the building and operated the laboratory from June 30 to July 9. Passed Asst. Surg. J. R. Ridlon was in charge from that date to August 8, when he was relieved by Passed Asst. Surg. C. W. Chapin. Dr. F. J. Hernández, who is the assistant bacteriologist in the insular laboratory, was appointed acting assistant surgeon in the service and aided the above-named officers in the laboratory work until January 1, when he resumed his position with the insular government.

The method of rodent examination in the laboratory was the same as used in the service operations in San Francisco. Laboratory attendants tacked the rodents to shingles, dissected them, and made clerical records concerning their source and any other data pertaining to the work. The appearance of the gross lesions was depended upon for diagnosis, and animal inoculation was required for purpose of confirmation of the diagnosis of plague in rats.

There was a marked reduction of infected rats in August, but a reliable estimate of rodent infection from the beginning of the epidemic in San Juan is precluded for several reasons. In the first week of rat examination there was no widespread trapping The rodents came from a comparatively small area. The town people at first turned in many rats, but later, as suppressive measures worked an inconvenience, they burned them. The difference of techinque employed during the first week or two and that used during the remaining weeks of the epidemic might be another source of error. The first rats were diagnosed by smear only, a bipolar bacillus determining the diagnosis; whereas later the gross lesions were considered and confirmation by animal inoculation was required.

During July and August a considerable number of rodents were encountered presenting marked subcutaneous injection with bubo. Smears made from the tissues would not infrequently show bipolar bacilli. Without animal inoculation these rodents might have been considered as probable plague. Rodents presenting this appearance were generally marked "suspicious" pending the result of animal inoculation. No great stress, however, was laid on the appearance of the smear from suspected rodents, as the invasion of all tissues by saprophytic organisms will not infrequently cause bipolar organisms to appear in the prepared smears, more especially if carbolthionin or Archibald's stain be used.

In addition to the examination of rats a number of mongoose which were caught in traps were sent to the laboratory for examination. None of them were found infected.

There was no evidence of chronic plague among any of the infected rats, unless the last rat from Caguas be so considered. This rodent had no bubo nor any gross lesion indicating plague. It was found dead on the premises from which "rodent case No. 3, Caguas," had been trapped, and for that reason white rats were inoculated with some of the tissues from this rat. The rat proved to be plague infected. The only lesions observed in this animal were adhesions of the pleura and of the spleen and liver. No bubo, pleural effusion, granulations in the viscera, or subcutaneous injection was noted.

Character of building from which infected rats were taken.

From dwellings	23
From food depots	8
From steamships	2
Turned in untagged	[1] 21
Found dead on streets	10
Taken from stables	2
Total	66

RAT INFECTION.

Sixty-six rats were diagnosed as infected, 34 prior to service assumption of the work and 32 subsequently. Of this total, 52 were from San Juan, 7 from Carolina, 4 from Caguas, 2 from Arecibo, and 1 from Rio Piedras. The first plague rats were diagnosed from smear only, the others by smear and gross lesions of rat, and confirmed by guinea-pig inoculation.

Prior to July 1 the species was not reported.

Classification of infected rodents.

Mus norvegicus	37
Mus rattus	4
Mus alexandrinus	1
Mus musculus	[2] 2
Unclassified	22
Total	66

The number of live rats examined during the months of July and August, for fleas, was not sufficient to estimate the percentage of infestation. The species of fleas found were: *Xenopsylla cheopis*, *Ctenocephalus canis*, *Echidnaphaga gallinacae*, and the *Rhynchoprion penetrans* (chigoe). The latter species of flea is quite frequently found on human beings in San Juan, but was not found on rodents. Burrowing beneath the skin, it ovulates, making a very painful nodule. Several plague cases were found to have these chigoe nodules. It would be of epidemiological interest to know whether the female immediately penetrates the skin of her first host and ovulates or whether she may feed on one or more hosts prior to depositing her eggs. This was not determined.

Passed Asst. Surg. C. W. Chapin reports the following series of flea counts in San Juan:

Date.	Number of rats examined.	Number of fleas.
Sept. 14–Oct. 14	54 living	18 Echidnaphaga gallinacae. (All from a lot of 6 Norvegicus.)
Oct. 24–Nov. 12	110 living	None.
Oct. 24–Nov. 15	2,022 dead	24.[3]
Nov. 16–Dec. 4	130 living, 751 dead	None.
Jan. 17–Feb. 15	59 living, 1,399 dead	94.[4]

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[1] Most of these were examined in first week of the epidemic.

[2] These two rodents, reported as mice, were taken from the house of a human case on June 24. On inquiry at a later date it developed that the prepared smear was examined by bacteriologist without seeing the rodents. The laboratory attendant, who prepared the smears, stated he was uncertain whether the rodents were mice or young rats—though they were reported as former species. With this exception all plague rodents examined prior to June 30 were tabulated as "rats."

[3] Some of these 24 fleas were lost or mangled. Of the 12 identified, 2 were Xenopsylla cheopis, 3 Ctenocephalus canis, and 7 Echidnaphaga gallinacae. Lice on rats are rare—a mite of barely microscopic size is very common. It is being studied.

[4] Of the 94 fleas in latter period, 85 were chicken fleas from 1 dead rat.

Passed Asst. Surg. J. R. Ridlon, from Mayaguez, reports the following flea count:

Date.	Rats examined	Fleas collected.	Average number fleas.	Total monthly rain, in inches.	Xenopsylla cheopis.	Ctenocephalus canis.
1912						
September	627	290	0.46	8.57	277	13
October	620	329	.53	23.35	274	55
November	221	110	.49	16.69	103	7
December	422	429	.90	.21	425	4

There is no marked difference shown in the number of fleas for the different months, but a tendency is shown for the number to increase during the month with the least rainfall.

The relation of fleas to rats varied on different days from 54 fleas from 3 rats to no fleas from 26 rats.

All rats were brought alive in traps to the laboratory and there chloroformed together with their fleas. The traps were brought to the laboratory inclosed tightly in a canvas sack or without covering. A comparative series of counts showed that no more fleas were found on the rats brought in the covered traps than those brought in the open traps.

The trap and all were placed in a can, the bottom of which was lined with paper. When the rats were dead they were combed and the interior of the can was searched carefully for fleas.

Asst. Surg. C. L. Williams, from Ponce, reports the following:

Date.	Number of live rats examined.	Number of fleas.
Sept. 1–Nov. 28	51	29 (Xenopsylla, 26; ctenocephalus, 3).
Nov. 29	30	9 (Xenopsylla).
Nov. 30	24	30 (Xenopsylla, 29; ctenocephalus, 1).
Dec. 1–9	103	45 (Xenopsylla, 39; ctenocephalus, 5; pulex irritans, 1).
Dec. 10–30	254	126 (Xenopsylla, 123; ctenocephalus, 3).

Dr. Williams reports not finding any *Rhynchoprion penetrans* or *Echidnaphaga gallinacæ* on the rats in Ponce. The contrast between the absence of the last species in Ponce and Mayaguez (on the southern and western sides of the island) in contrast to the frequency of rat infestation by this species in San Juan is noteworthy.

HUMAN CASES.

As mentioned above, the first known case occurred June 10, though unrecognized at the time of burial. At the time of official proclamation of infection there had occurred 12 cases. The number increased to 31 on July 7, when the service took charge of eradicative measures. Thereafter occurred 24 cases, the last one on September 13. Of this series 36 died and 19 recovered. Of the total number 12 cases were diagnosed clinically, 3 cases by smears from aspirated bubo, and 40 cases by guinea-pig inoculation. Five cases were in the old city, 6 cases from La Marina, 5 cases from La Perla, 21 cases from Puerto de Tierra, 14 cases from Santurce. Outside of San Juan 3 cases were from Carolina and 1 from Dorado. One of the Carolina cases, though charged to Carolina because infection was contracted there, died some 4 miles distant from Carolina. One case charged to San Juan died on a schooner at Arroyo. He was taken ill shortly after leaving San Juan.

INFECTIVITY OF HOUSES.

Infectivity of houses sufficiently prolonged as to cause secondary cases was noted in four instances, three of which were in mampostería buildings. These, however, were in the first days of the epidemic before sulphur fumigation or rat proofing had commenced.

ACKNOWLEDGMENTS.

It is desired to make acknowledgment to Dr. W. F. Lippitt, director of sanitation for Porto Rico, and to his subordinates in the insular department, for the fullest cooperation throughout the campaign. To all work done by the service toward plague eradication Dr. Lippitt extended his heartiest support. Without his effective assistance the comparatively early success in plague eradication could not have been obtained. The service officers are greatly indebted not only to the director of sanitation for generous support in the epidemic work, but also to Gov. George R. Colton, Acting Gov. M. Drew Carrel, and to the different departments in the insular government.

While all the field force that were retained throughout the service operations worked faithfully, Inspectors Juan Torres and Martín Paniagua are deserving special commendation.

Pharmacist F. L. Brown and Mrs. M. D. Hernández, secretary-interpreter, were unsparing in their labors and rendered invaluable service in the transaction of office affairs.

Regulations promulgated for rat proofing follow:

GOVERNMENT OF PORTO RICO,
OFFICE OF THE SECRETARY,
San Juan, P. R., July 15, 1912.

[Administrative Bulletin No. 45.]

BY THE ACTING GOVERNOR OF PORTO RICO.

A PROCLAMATION.

Sanitary rules and regulations No. 3.—Rat proofing of all buildings and outhouses in Porto Rico; regulations governing; promulgated.

The following rules and regulations, prescribed by the insular board of health and approved by the executive council on July 11, 1912, are hereby promulgated for the information and guidance of all concerned:

REGULATIONS GOVERNING THE CONSTRUCTION AND MAKING RAT PROOF OF ALL BUILDINGS AND OUTHOUSES IN THE ISLAND OF PORTO RICO.

"SECTION 1. From and after the approval of these regulations, no house or building, storehouse, store, warehouse, etc., can be constructed without submitting to the sanitary service a special plan providing that the floor of the lower story be made of concrete when the floor is not to be a sufficient height from the ground to permit free access; or the wooden floor may be placed immediately on top of the concrete without leaving any space which may serve as a refuge for rats (no wood or other inferior material shall be used under the flooring. Concrete floors shall have wall of concrete or stone extending at least 2 feet below the surface of surrounding ground and shall also have a concrete or masonry wall extending 1 foot above the level of the floor, the walls of buildings to fit flush on top of concrete or masonry walls); and what other means are to be adopted in order that said buildings and establishments may be rat proof are to be clearly specified. The sanitary service is authorized to approve or to make in said plans the changes which the case may require, without which approval the work, which must conform in each case to the definitely approved plan, can not be commenced.

"The plans must be sent directly to the health officer: *Provided*, That these regulations shall be understood as amplifying the provisions concerning plans in the regulations now in force concerning constructions.

"SEC. 2. In houses and buildings already constructed the following rules shall be observed:

"Dwelling houses which have the floor of the lower story of wood shall be made rat proof by (1) raising the floor to a height of at least 2 feet from the ground with all underpinning free, or (2) shall have all space beneath flooring made rat proof by a foundation wall of stone or concrete extending below surface of ground to depth of 2 feet and fitting flush the floor of house. All decayed wood must be replaced.

"SEC. 3. In no dwelling house or building shall food, remnants of food, or other matter which may be made use of by the rats, be kept, except when placed in pantries, storerooms, or receptacles constructed so as to be inaccessible to said rodents.

"Sec. 4. Roofs, garrets, courtyards, yards, alleys, cellars, and any other open space belonging to houses or buildings must be kept free from food, garbage, forage, and other material which may serve as food or as a refuge for rats.

"Sec. 5. Sinks, drains, gutters, and private sewers shall be kept strictly clean.

"Sec. 6. Cocoanut-palm trees, mango, and fruit trees which furnish food for rats and are situated in gardens or orchards of any house or building within the city limits or within the neighborhood of any town, at the discretion of the health officer and with the approval of the director of health, shall be kept free of rats, first exterminating those already existing, and protecting the trunk of the tree with a band of tin or zinc and other suitable means to render the trees inaccessible to the rodents.

"Sec. 7. Every building intended for a market, warehouse, storehouse, bakery, macaroni factory, distillery, pastry shops, stores, groceries, wine cellars, piers, hotels, cafés, restaurants, eating houses and booths shall be subject to the rules prescribed for dwelling houses and buildings: *Provided, notwithstanding*, That markets, piers, warehouses, and any storehouse of provisions must necessarily have the floor of concrete or plaster, and further:

"(*a*) Provisions and other articles in storehouses or on sale at wholesale or retail shall be kept in piles placed upon platforms which shall be at least a foot above the pavement, and arranged in rows, leaving free spaces between to permit of easy cleaning and for sanitary inspection. The floor shall be kept free of provisions spilled either through breakage or through handling of the receptacles which contained them.

"(*b*) Groceries, small shops, and other establishments which sell at retail shall have all the provisions for daily consumption in lockers or cupboards placed in such a way that they shall be inaccessible to rats.

"Sec. 8. Lots and ground not built upon within the city limits shall be subject to the preceding regulations which may be applicable.

"Sec. 9. Barnyard fowls shall not be kept within the city limits of any town except under the following conditions:

"A rat-proof henhouse shall be constructed which must have a concrete floor as well as walls of the same material, which shall be sunk in the ground to a depth of 2 feet and raised 1 foot above the level of the floor. This surface must be surrounded by wire netting which shall have a half-inch mesh and be 6 feet high. Food intended for the fowls must be kept within these henhouses so that it shall not be accessible to rats, and it will not be permitted in any case to deposit it outside.

"Sec. 10. Stables and stalls within the city limits must fulfill the following conditions:

"1. Each horse cared for shall have a space of not less than 5 square meters.

"2. The floor shall be of concrete and with an adequate slope, as of one-eighth of an inch per foot.

"3. Upon this concrete floor may be placed planks for a floor for the horses; this shall be made in parts or sections so that it may be easily raised. The boards which form the floor shall be separated by at least 2 inches.

"4. The sections or parts of the floor must be raised once a week in order to do the necessary cleaning.

"5. Each stable shall be provided with a well lined with cement in which to deposit the manure, the well to have a capacity of at least one-fourth of a cubic meter for each horse. Said receptacle shall have a well-fitting cover divided into two sections.

"6. The manure shall be placed in said receptacles and carefully covered. The cleaning of said wells or receptacles shall be done once a week and the manure carried to the place which the director of health may designate.

"7. The stable, stall, manger, and their surroundings must be kept strictly clean.

"8. Grain to be used as food for the live stock shall be kept in a rat-proof box.

"9. Each manger shall be placed at a minimum distance of 2 feet from the wall or building and its sides shall have a slope of 2 inches toward the bottom and shall be covered with tin or zinc, and the said manger shall be at least 18 inches deep to avoid the spilling of food.

"Sec. 11. These conditions must be fulfilled within a period of time which the director of health in each case shall fix in accordance with the importance of the work and the means to be obtained in that locality.

"Sec. 12. Every infraction of any of the rules set forth in there regulations shall be punished with a maximum fine of $100, and the director of health shall have the necessary work done at the expense of the owner, in accordance with the law of sanitation in force: *Provided*, That those persons who prove that they do not possess more than one piece of property whose value does not exceed $100, according to the official assessment, shall be exempt from payment, and the said work shall be done, in this case, at the expense of the public treasury."

Being so promulgated, and having been published in two newspapers of general circulation in the island, in accordance with the provisions of section 13 of Act No. 81, approved March 14, 1912, the said rules and regulations, entitled "Regulations governing the construction and making rat proof of all buildings and outhouses in the island of Porto Rico," on and after this date have the force and effect of law.

In testimony whereof, I have hereunto set my hand and caused the seal of the Government of Porto Rico to be affixed at the city of San Juan, this 15th day of July, A. D. 1912.

[SEAL.]

M. DREW CARREL,
Acting Governor.

Promulgated according to law, July 15, 1912.

R. SIACA PACHECO,
Acting Secretary of Porto Rico.

San Juan—Inspection of outgoing freight.—All freight leaving San Juan was subject to inspection and fumigated if its character was such as to render possible the harboring of rats. All cars were inspected, and if not rat proof were remanded to the railroad shop for the purpose of making them so. A copy of instructions to inspectors follows:

To inspectors in charge of freight inspection:

For your information and guidance the following directions for the inspection of freight are hereby given.

All packages loaded into cars will fall under two classes:

1. Those which will have to be fumigated.
2. Those which can be inspected and passed.

In a general way those packages which can be passed by inspection are as follows:

All boxes and barrels which are unbroken and which do not permit a rat to enter, if packed outside of San Juan.

All freight contained in unbroken sacks; baled hay—this last-named article shall be thoroughly inspected.

The following articles in a general way will require either to be repacked or subjected to a sulphur fumigation.

Merchandise packed within San Juan; any crated material, especially chinaware or crockery or any articles which are packed in hay or straw, whether they originated in San Juan or outside of San Juan, irrespective of their origin; any barrel or boxed goods in which the container has been broken so as to admit the entrance of a rat. All goods within any container whatever which will permit the harboring of a rat.

These will be your general instructions. You will, necessarily, have to use discretion in difficult cases, and you will bend your energies to see that no article or freight that could contain a rat leaves the depot. All cars must be loaded by daylight. After a car has been completely loaded it shall be sealed, and you will attach a paster across the seal.

In order not to duplicate fumigation of freight, as soon as the fumigation room is open and you can enter in safety, you will immediately attach a fumigation paster to each article. In all cases of freight in which you are not certain as to whether they should be passed or fumigated you will call up this office by telephone for further instructions.

Respectfully,

R. H. CREEL,
Passed Assistant Surgeon,
Public Health and Marine-Hospital Service.

Dorado.—The case of plague reported at Dorado July 15 was in the person of a 14-year-old boy, who had not been out of Dorado, and his infection, therefore, presumably occurred at that place. Active measures were instituted at Dorado, which is quite a small town, having a population of 900 people and less than 200 buildings. No other cases occurred.

Rat examination along railroad.—Instructions were given to health officers along the line of the Porto Rican Railroad to send to the laboratory, as soon as possible, rats taken in the vicinity of railroad stations. This action was due to the supposition that the infection at Carolina and at Dorado may have been transmitted by means of the railroad.

PLAGUE-ERADICATIVE MEASURES IN ARECIBO.

Work was carried on from January 3 to February 15, 1913, and consisted of measures for rat-proofing buildings and the extermination and laboratory examination of rodents.

Previous to this time two plague-infected rats had been found in Arecibo, and it seemed imperative that a vigorous campaign of rat extermination and rat proofing should be carried out.

Arecibo is a seaport town on the northern coast of Porto Rico, with about 15,000 inhabitants. The most common type of buildings was a wooden structure, and many had little if any elevation from the ground. Many of these buildings had a roof of Spanish tile, which afforded rat harborage.

Summary of rat-proofing operations.

Dwellings inspected	1,342
Food depots	105
Stables	5
Notices served	728

LABORATORY OPERATIONS.

Form January 21 to February 15 a laboratory was maintained at Arecibo for the examination of rats from the three towns of Arecibo, Manati, and Aguadilla.

A force of 10 rat catchers, with two foremen, was employed in Arecibo and the number of rats in the town reduced to a minimum.

During this time no plague-infected rat was found in Arecibo. A classification of rats examined follows:

Rat examination from Jan. 21, to Feb. 14, 1913.

Species:	
Mus norvegicus	544
Mus rattus	92
Mus alexandrinus	286
	922
Place where collected:	
Arecibo	449
Manati	191
Aguadilla	282
	922

PLAGUE-ERADICATIVE MEASURES IN CAGUAS.

Previous to the arrival of Asst. Surg. C. L. Williams the work had been progressing under the insular service of sanitation except for a short period in September, subsequent to the discovery of infection among the rats when the Public Health Service had control. It was found that a great deal of work had been done by the service of sanitation; nearly the entire town had been inspected and several hundred notices to rat-proof buildings served with 111 compliances on record.

The methods of rat proofing followed the same lines as in San Juan and Ponce, with a few modifications due to local conditions. The town consisted largely of small frame houses flat on the ground and mostly in poor condition. These were all ordered to be raised 2 feet with underpinning free, without option of placing a concrete wall around perimeter unless an entirely new floor was laid in the building.

As stated above, the condition of the records renders precise statements impossible. A compilation of those on hand which represent 1,063 houses of a total of not over 1,500 shows the following:

Tabulation of buildings in Caguas.

Total number of buildings, estimated	1,463
Number of buildings inspected	1,063
Number of buildings passed as satisfactory	46
Number of buildings notified to be rat proofed	1,017
Buildings in which rat proofing was enforced by insular service of sanitation	111
Buildings in which rat proofing was enforced by Public Health Service	360
Buildings in which work was progressing at time of discontinuance of service operations, Feb. 15	161
Buildings that have not been repaired according to orders	385
Total	1,017

Buildings rat proofed.

Food depots	54
Stables	1
Dwellings	305
Total	360

NOTE.—Does not include the 111 enforced by insular service of sanitation.

Methods of rat proofing.

Food depots:	
Concrete floors	54
Tile roofs changed or made rat proof	17
Dwellings:	
Elevated with underpinning free	226
Concrete wall around perimeter, fittings flush with floor	57
Tile roofs changed or made rat proof	85
Latrines rebuilt of concrete	26
Houses destroyed	10

NOTE.—Many minor repairs are not listed in this table.

PLAGUE-ERADICATIVE MEASURES IN CAROLINA.

Before the arrival of Dr. Williams in Carolina the department of sanitation had started to work, having torn down several rat-infested houses.

The work carried on consisted chiefly in tearing up the floors of stores and warehouses and killing the rats and in thoroughly cleaning up all rubbish. All houses were first surrounded by a ½-inch mesh wire fence to prevent escape of rats.

While stores and warehouses, the principal rat centers, received most attention, the floors of dwelling houses that appeared rat infested or likely to harbor rats driven out elsewhere were torn up as well. In three instances frame houses were torn down, being so infirm as to render tearing up of floors unsafe for workmen.

In compliance with the more active measures house-to-house inspection of the entire town was made, and the tenants instructed regarding the measures to be taken to rat proof each house. Much work was done by them.

Tabulation of work performed.

Number of houses	418
Number of food depots	26
Number of stables	3
Houses destroyed:	
Mamposteria	1
Frame	3
Floors torn up:	
Cement	4
Wooden	35
Latrines destroyed	22
Yards cleaned out	17
Rats caught, approximately	350

Improvements ordered.

Houses ordered raised to height of 2 feet	73
Houses to be raised by excavation beneath	60
Concrete floors ordered in stores or warehouses	19
Latrines ordered rebuilt of concrete	58
Latrines to be rat proofed with facing of concrete on outside and concrete top	137

Houses already rat proof.

Raised 2 feet or more	152
Houses in Cabro Sucio raised 2 feet or more, estimated	100
Houses with rat-proof concrete floors	10

As a model to be followed in reconstruction of latrines, a latrine of concrete was built.

PLAGUE-PREVENTIVE MEASURES IN PONCE.

On the arrival of Asst. Surg. C. L. Williams in Ponce inspectors and a rat-catching force consisting of 12 laborers, 3 foremen, and 2 laboratory assistants were employed. Wire traps to the number of 240 were already in use in the city. These were turned over by the service of sanitation and 724 snap traps were sent from San Juan. They were all distributed to the rat catchers, and the catching and examining of rats was begun at once. A suitable laboratory was furnished and equipped by the service of sanitation.

The city was divided into 12 districts, 10 in the city proper and 2 in the playa, or water front, which is about 2 miles from the rest of the city and contains most of the large warehouses. There are no docks with the exception of one under construction which will be, when completed, as near rat proof as it is practicable to make a dock, concrete and metal only being used in construction. Each inspector was given 6 districts.

As food depots and stables were considered the most important they were inspected, notified, and the notices enforced before dwellings were taken up.

The methods of rat proofing followed the same lines as in San Juan, with the exception that none of the mamposteria construction of the same nature as that found in San Juan exists in Ponce. The old masonry here consists of stone or brick with a mortar made of sand and lime instead of sand, mud, and lime, and is much firmer and more lasting than that in San Juan. A 1-inch facing of cement on these walls made them amply rat proof.

Dwellings of frame were required to be raised 2 feet with underpinning free, or surrounded with concrete wall 2 feet deep and fitting flush with floor, replacing all rotten wood.

A remarkable tendency to construct raised houses is seen in Ponce as shown by the appended tables in which it is seen that 85 per cent of the dwellings were found rat proof. Masonry houses were for the most part found in good condition and only a few needed extensive floor repairs. The reason for this tendency to build raised houses is probably the frequent floods that inundate the city in the wet season.

Tabulation of work accomplished in Ponce.

Population	46,000
Total number of buildings	8,321
Number of buildings passed as satisfactory	6,835
Number of buildings ordered to be repaired	1,477
Number of buildings in which orders were complied with	958
Number of buildings in which orders were not complied with	[1] 528

Method of rat proofing.

Food depots:	
Concrete floors	301
Elevated 2 feet with underpinning free	9
Destroyed	4
Latrines rebuilt	15
Minor repairs	61
Dwellings:	
Elevated 2 feet with underpinning free	492
Surrounded with concrete wall 2 feet deep fitting flush with floor	16
Repaired floor	39
Latrines rebuilt	126
Minor repairs	38
Destroyed	15
Stables: Number made to conform to regulations of service of sanitation	43

LABORATORY REPORT.

Rats.—The laboratory report only covers the work from August 26, 1912, to January 1, 1913, when the laboratory was discontinued. In that time 2,654 rats were killed and examined. None of these were found infected with plague. The weekly reports of rats caught show an increase in the first few weeks, after which the numbers remain fairly constant until the last month, when there is a slight decline. During December there was a greater number of Mus alexandrinus and Mus rattus caught.

Fleas.—A limited flea survey was made between the dates of November 29 and December 30. Rats were examined for fleas, 237 being taken from them. The flea count varied considerably with different lots of rats. The greatest number of fleas on any one rat was 10, found on each of two specimens, one a Norvegicus the other an Alexandrinus. All these rats were brought to the laboratory alive and chloroformed in a closed bucket, the bottom being covered with white paper.

NOTES OF AN INFECTIOUS DISEASE RESEMBLING PLAGUE.

During the first month or two of the laboratory a considerable number of rats from the playa showed skin injection, markedly enlarged inguinal glands, and enlarged but not particularly dark spleen. Several plague-infected rats in San Juan presented almost identical lesions. All of these, however, proved negative to guinea pigs. After the second month more cases were found. In smears from the glands and spleen no constant organism could be discovered.

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[1] Of these, 519 were dwellings.

Rats examined.

Week ending—	Mus norvegicus.	Mus alexandrinus.	Mus rattus.	Total.
Aug. 31	....	....	....	9
Sept. 7	....	....	....	65
Sept. 14	....	....	....	74
Sept. 21	88	42	8	138
Sept. 28	152	24	7	183
Oct. 5	135	72	8	235
Oct. 12	118	34	8	160
Oct. 19	149	57	4	210
Oct. 26	99	62	13	174
Nov. 2	104	50	12	166
Nov. 9	97	41	5	143
Nov. 16	115	40	6	161
Nov. 23	80	52	8	140
Nov. 30	77	58	14	149
Dec. 7	73	67	24	164
Dec. 14	87	64	20	171
Dec. 21	81	82	27	190
Dec. 28	62	47	13	122
Total	1,537	792	177	2,656

Rats examined for fleas.

Number of rats examined	462
Fleas found	237

Percentage of infestation, 0.51 flea per rat.

Classification of fleas.

Xenopsylla cheopis	226
Ctenocephalus canis	10
Pulex irritans	1

PLAGUE-PREVENTIVE MEASURES AT MAYAGUEZ.

Plague eradicative measures were commenced on September 1, 1912, and continued to February 15, 1913. The work may be divided into two parts: Measures taken in regard to rat proofing of buildings and measures taken in regard to rat extermination.

Mayaguez has a population of about 20,000. Most of the buildings on the main streets are of mamposteria construction, while those in the outlying districts are mostly of frame construction.

A summary of the inspections and compliances from September 1, 1912, to February 15, 1913, follows:

Dwellings inspected	1,717
Food depots	209
Notices served	1,141
Corrections made	904
Groceries out of business	14

Rat proofing in Mayaguez from Sept. 1, 1912, to Feb. 15, 1913.

Nature of corrections.	Number of corrections.	Cost of corrections.
Dwellings surrounded by concrete wall extending 2 feet below the surface of the ground and perfectly adjusted to the floor	353	$5,331
Food depots, concrete floors, with concrete walls 2 feet below the surface of the ground and 1 foot above the floor level	174	19,475
Dwellings, elevation of 2 feet secured by raising the building or excavation beneath.	88	663
Miscellaneous, including renovation of wooden floors and rat proofing double walls.	275	706
Food depots out of business	14	....
Total	904	26,175

EXTERMINATION OF RODENTS.

A force of 10 to 12 men was employed from August 29 to December 30 in rat catching and a laboratory maintained for the examination of rodents from August 29 to October 31, inclusive, and from November 16 to December 30, inclusive.

A summary of rat examinations from August 29 to October 31, inclusive, and from November 16 to December 30, 1912, follows, all rats examined being caught in Mayaguez:

	Negative.
Mus norvegicus	4,432
Mus rattus	303
Mus alexandrinus	813
Mus musculus	152
Mongoose	20
Total	5,720

No plague-infected rodent was found.

FLEA INFESTATION OF RATS IN MAYAGUEZ.

A flea survey was carried on in connection with the examination of rats for plague infection in Mayaguez during the last months of 1912. All rats were brought alive in traps to the laboratory and there chloroformed, together with their fleas. The traps were brought to the laboratory inclosed tightly in a canvas sack or without covering. A comparative series of counts showed that no more fleas were found on the rats brought in the covered traps than those brought in the open traps.

The trap and contents were placed in a can, the bottom of which was lined with paper. When the rats were dead, they were combed and the interior of the can was searched carefully for fleas.

The following table shows the result obtained:

Flea infestation of rats.

Month.	Number of rats examined.	Number of fleas collected.	Average number fleas per rat.	Mean monthly temperature.	Total monthly rain.
1912.					*Inches.*
September	627	290	0.46	78.4	8.57
October	620	329	.53	78.1	23.35
November	221	110	.49	77.3	16.69
December	472	429	.90	76.9	.21
Total	1,940	1,158	.64	....	....

There is no marked difference shown in the number of fleas for the different months, but a tendency is shown for the number of fleas to increase during the month with least rainfall.

The relation of fleas to rats varied on different days from 54 fleas from 3 rats to no fleas from 26 rats.

A classification of fleas follows:

Classification of fleas.

Month.	Number of fleas collected.	Xenopsylla cheopis.	Ctenocephalus canis.	Percentage of Xenopsylla cheopis.
1912.				
September	290	277	13	95
October	329	274	55	83
November	110	103	7	93
December	429	425	4	99
Total	1,158	1,079	79	....

It is here seen that the *Xenopsylla cheopis* (Rothschild) is the prevalent rat flea in this section and is the same flea that has been proven by workers in India as being most concerned in the transmission of plague.

Identification of fleas was confirmed by the Bureau of Entomology, Department of Agriculture.

INVESTIGATION OF ROCKY MOUNTAIN SPOTTED FEVER.

Passed Asst. Surg. T. B. McClintic ended his two years' campaign against Rocky Mountain spotted fever with his life in August, 1912.

Surg. L. D. Fricks arrived in Missoula, Mont., March 30, 1913, and in conferences with the governor and the State health officer, held in Helena April 1, and the governor, State board of entomology, and a representative from the Bureau of Entomology, Department of Agriculture, held April 11, also in Helena, the campaign for the season was outlined and the division of the eradicative work in the Bitter Root Valley determined.

The work during the season was limited to tick eradication.

A census of the domestic animals in the Victor district was taken, which showed 1,856 horses and cattle on the west side of the Bitter Root Valley within a radius of 5 miles of the dipping vat. Of these approximately 300 ranged on tick-infested area. The dipping of these domestic animals was begun April 18, being hampered in the beginning by a late, cold spring. All domestic animals in the Victor district which ranged over tick-infested territory were dipped at least three times during the season.

A second concrete dipping vat was constructed in the Hamilton district, 10 miles south of the Victor vat. It was not completed until the latter part of the tick season, but was in operation twice, and a small number of animals were dipped.

A stock census of the Hamilton district was taken, which showed 1,659 domestic animals, and of these approximately 200 ranged on tick-infested territory.

A series of experiments were begun with a view to determining the mortality of wood ticks, *Dermacentor andersoni,* upon sheep. So far as carried, these experiments indicate strongly that extensive sheep grazing may be the means of eliminating tick infestation in the Bitter Root Mountains. Steps have been taken to continue the experiment on a large scale next year.

Several conferences were held in Missoula with the district supervisor and other officers of the Forest Service in regard to sheep grazing in the Bitter Root Mountains and the burning over of the west side foothills and slashings late next spring.

The officers of the Forest Service conferred with rendered much assistance.

The campaign of ground-squirrel eradication was continued by the instruction of the west side farmers in the use of the squirrel destructors employed by the service in California. Practically all of the farmers have expressed a willingness to free their premises from these pests at odd times during the next squirrel season, and in this way the only objection which has been raised against the destruction of small mammals, its expense, will be eliminated.

Tick surveys were made of Sweathouse and Bear Creek canyons and the territory between Sweathouse and Big Creek on the west side of the Bitter Root Valley and of Willow Creek and Sleeping Child canyons on the east side of the valley.

During the season seven cases of Rocky Mountain spotted fever with six deaths were reported from the Bitter Root region. Only one of these cases occurred in the upper half of the valley in which the service has been operating, and none in the Victor district, where Passed Asst. Surg. T. B. McClintic carried on his eradicative campaign.

ALASKA.

At the request of the Bureau of Education an officer of the Public Health Service was detailed to the Department of the Interior for the purpose of supervising all measures relative to the medical and surgical relief of the natives of southern Alaska, the sanitary improvement of their surroundings, and to make studies of the prevalence of disease and of conditions which favor its spread, with a view to inaugurating adequate measures for prevention.

Passed Asst. Surg. Emil Krulish was detailed for this service in March, 1912. During the period from April to November, 1912, he visited the towns and native villages on the southern coast of Alaska, in Cook Inlet, on the Yukon River, and on the coast of Bering Sea. Transportation facilities were inadequate, uncertain, and at times difficult. On his tour of investigation he traveled on the regular passenger steamers, in private launches, by private team, on railroad trains, and on revenue cutters, covering in all a distance of approximately 7,000 miles.

Throughout his itinerary study was made of the sanitary conditions in the settlements and native villages and of the prevailing diseases in each section. Physicians and other persons who possessed knowledge of conditions were interviewed. As many natives were examined as possible, and in these examinations special effort was made to determine the number suffering with tuberculosis, trachoma, or venereal disease.

The report of investigations made by Dr. Krulish was published in the Weekly Public Health Reports of March 21, 1913.

SANITARY INSPECTION OF GOVERNMENT BUILDINGS.

EXECUTIVE ORDER.

(No. 1498.)

The Surgeon General of the Bureau of Public Health and Marine-Hospital Service is hereby directed to inspect, or cause to be inspected, all buildings and offices used by the Government of the United States in the District of Columbia for the purposes of any of the executive departments, at least once in each month, and to report to the head of the department by which such building is occupied the sanitary or hygienic condition of such buildings and offices, making to the head of such department such recommendations and suggestions as may be deemed necessary to promote the sanitary or hygienic condition of such department or office.

Copies of such reports shall also be filed with the Secretary to the President.

WM. H. TAFT.

MARCH 15, 1912.

In accordance with this Executive order, on May 12, 1912, the Surgeon General detailed for this duty Passed Asst. Surg. B. S. Warren. who submits the following report:

The work of inspection of sanitary and hygienic conditions existing in the buildings in the District of Columbia, occupied by the executive departments (except the War and Navy Departments) has been continued, and all the buildings covered by the order have been inspected. Recommendations and suggestions deemed necessary to promote hygienic conditions and to remedy insanitary conditions have been made, in accordance with the order, and those responsible for existing conditions have in most cases endeavored to carry the suggestions into effect; but the lack of suitable buildings and available appropriations has greatly hampered and discouraged many in their efforts at betterment.

The reports of existing insanitary conditions have been used with telling effect by the heads of departments as arguments for larger appropriations for new buildings and repairs to old buildings. The reports have also aroused all concerned to the necessity for changes in methods of management where existing methods have not been effective in maintaining clean, sanitary offices.

Reinspections of the buildings are probably promoting sanitary improvements more than the first inspection, and it has been found that to make recommendations effective they must be followed up.

Overcrowding.—Many rooms were found overcrowded, the air space per person often falling below 500 cubic feet and the floor space below 40 square feet per person. Crowded in this way, there must necessarily be close contact between employees, and the consequent transmission of those diseases that are spread by contact.

Lighting.—Owing to construction (columns, porticoes, ornamental balustrades, interior courts, basements, etc.) many rooms are dark, and employees must work by artificial light. The artificial lighting is for the most part sufficient. The mercury tubes are in use in some buildings, but are being gradually dispensed with owing to complaint of employees.

Ventilation.—Doors, windows, and corridors are, with few exceptions, depended upon for ventilation. If they could be kept open, the ventilation would be satisfactory, but those next to the windows can not stand the drafts, and as a consequence the doors and windows are kept closed during cold and cool weather. Few windows are opened when the outside temperature is 60° F. or below.

Some officers have adopted the rule that all windows shall be opened wide at stated times during the day. This aids ventilation, but, even with such rules, the rooms are found to be close and stuffy.

Records of humidity were made during the winter months in one building, and showed that for more than 62 per cent of the time the indoor relative humidity was below 31 per cent. In no building is there any provision made for adding moisture to the air.

Water supply.—In practically all buildings the city water is depended upon. In a few buildings a supply system is used, which is free from chances of local contamination, but for the most part coolers are used, and the water is subject to chances of contamination by those who clean and fill the same.

The common drinking cup and common towel were found in use in most buildings, but they have, upon recommendation of the inspecting officer, been abolished in most departments, and individual cups and towels placed in use.

Heating.—Very little complaint was heard of insufficient heat, but many rooms were found overheated.

In some departments, during the summer, certain rooms are very warm, so much so that the employees should not be compelled to continue work in them on hot days.

Cleanliness.—In practically every department the cleaning force is insufficient; as a consequence many offices were poorly kept. Recommendations relative to methods of expediting the work of the present force of cleaners by neat and orderly arrangement of rooms, furniture, books, papers, etc., have been adopted by most departments; as a consequence there has been a marked improvement in this regard. There is still much room for improvement especially in those offices that are obviously overcrowded.

The necessity for providing a special building for old files is everywhere observed; such a building would solve much of the dust problem, which is now the concern of those responsible for keeping offices clean and free of dust.

Plumbing, sinks, toilets, etc.—In all but a few of the offices, the plumbing, sinks, toilets, etc., were found in fair sanitary condition, and ordinarily they were well kept. In a few cases old, insanitary fixtures were noted, and condemned because of being poorly kept.

Some buildings were found so unfitted for the purposes for which used, and in such insanitary condition that the only remedy is new quarters.

The work of inspection is so extensive that one man can not make the rounds each month, and the conditions found suggest the necessity for extending the work to the executive buildings outside the District of Columbia.

In order that these reports of insanitary conditions may be made of greater value, it is highly desirable that records be kept of the morbidity and mortality among the Government employees occupying the buildings, to determine the effects of such employment on the health of the individual. At present many insanitary conditions are reported, but their effect on the health of the employees can not be determined without records of sickness and death. It seems equitable that any employee who is drawing full pay while sick or injured should furnish all the information as to the cause of his disability, that such cause, if due to the occupation or environment, may be investigated and remedied so far as practicable.

Cooperation with State and Local Health Officers in Ohio and Indiana during the Time of Flood.

Pursuant to verbal orders of March 27, 1913, from the Secretary of the Treasury, Surg. Gen. Rupert Blue and Asst. Surg. Gen. W. C. Rucker proceeded to the flooded districts of the Ohio and Mississippi Valleys, and assumed charge of the sanitary work for the purpose of preventing the interstate spread of disease. The Surgeon

General not only directed his own officers in the field, but aided the local health authorities with timely advice on sanitation. He was accompanied throughout his journey by Asst. Surg. Gen. W. C. Rucker. On arrival at Cincinnati, Ohio, at 11 p. m., March 28, he proceeded immediately with the city health officer for conference with the mayor, Mr. W. T. Hunt. At this conference the mayor stated that he had sent a large number of physicians and nurses to Dayton, and that for the present the sanitary assistance which the city of Cincinnati was lending to Dayton was under the charge of city health officer, Dr. J. H. Landis.

The Surgeon General made an inspection of the flooded region and when he returned found that Dr. Rucker, in consultation with the citizens' relief committee, had practically completed a plan of operation.

The Surgeon General directed the medical officers in command of the United States marine hospitals at Louisville, Ky., Cairo, Ill., and Evansville, Ind., to render all possible assistance in case of emergency from the flood conditions, and keep the bureau informed daily of the situation. The Surgeon General also addressed a letter to the general superintendents of the six railroads entering Cincinnati requesting their cooperation in the prevention of the spread of disease by polluted water supplies intended for passengers in interstate traffic.

Although the economic losses in the flooded regions were very great, and large numbers of persons lost their lives by reason of the high water, it was not feared that great danger from communicable disease need be apprehended in the flooded district. The sanitary campaign consisted in getting the people back into their houses as soon as possible, in the installation of proper methods of disposal of refuse of various sorts, and the boiling of drinking water until such time as the city water supply could be regarded as safe.

On March 27, 1913, the Surgeon General ordered Surg. C. W. Wille to proceed from Cleveland, Ohio, to the flooded districts of Ohio. Surg. Wille reported to Secretary McAdoo that he had succeeded in reaching Columbus at 4 o'clock on the afternoon of the 27th. Surg. Wille submits the following report:

> Pursuant to instructions contained in bureau telegram of the 27th ultimo, I departed from Cleveland on the first available train at 6 a. m., March 28, and arrived at Columbus at 4 p. m. on the same day. I immediately called upon Dr. F. W. McCampbell, secretary Ohio State Board of Health, and with him conferred with Gov. Cox in regard to conditions in the flooded district of Columbus. In conference with Dr. McCampbell and the city health officer, it was decided to make a rapid sanitary survey of the flooded district of Columbus, which was completed by noon of the 29th ultimo. Following this survey conjoint recommendations were submitted to the governor relative to necessary sanitary measures to be put in operation in the district, these to be carried out under the supervision of the city health office in cooperation with officials of the State board of health. This report embraced recommendations pertaining to the establishment of a west side morgue and relief station, and to permit the former occupants of the flooded houses to return to them to expedite their cleaning. The loss of life at this time could not be determined; the destruction of property, however, was extensive on the lowlands immediately to the east and west of the Scioto River. The health department of the city of Columbus was found to be an effective and efficient working unit, and was, upon my arrival, engaged in formulating plans for an active and systematic sanitary campaign in the flooded district.
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> Upon request of Gov. Cox to proceed immediately to Dayton, I departed during the afternoon of the 29th ultimo by first available military train and arrived about 11 p. m. that night. I found the city in total darkness, with gas, electric, water, and sewage systems out of operation. On account of the lack of transportation facilities, it was

impossible to reach the National Cash Register Co. that night, which was understood to be the center of operations for relief of the situation. Upon my arrival at the National Cash Register Co. early on the morning of the 30th ultimo, I immediately conferred with Mr. Patterson, president of the company, and Drs. Herman and Ewing, local practitioners, these three constituting what appeared to be the only centralized authority immediately in touch with the situation. Immediately after this conference a survey of the flooded district was made, in conjunction with Dr. Herman and two representative business men.

The flooded district embraced a wide area of the business center and residential portion immediately surrounding the confluence of the Great Miami and Mad Rivers. As a result of this survey the gravity of the situation was at once apparent. Many of the streets were partially submerged and filled with wreckage of all description; basements were flooded, sewers choked, and water supply entirely interrupted, the pumping station having been flooded. The actual loss of life could not be determined although many bodies were being recovered from the wreckage as the waters subsided. As rapidly as the bodies were recovered they were transported to a temporary morgue which had been established at the plant of the National Cash Register Co. and there embalmed. At this time a supply of artesian water was being distributed by a local brewing company, who placed their wagons and equipment at the service of the city. Practically all closets and urinals were filled to overflowing, and much of the organic refuse, fecal matter, etc., was being deposited in the yards and streets of the district. Dead animals of all descriptions, principally horses, were found scattered about. Their condition rendered it imperitive that they be removed at once. Upon completing the survey and after establishing provisional sanitary headquarters at the Elk's Club, we returned to the office of the National Cash Register Co. and drew up plans of a systematic campaign of sanitation for the flooded district. It was decided the central authority was to be vested in a commission to consist of Maj. Rhodes, who with the Secretary of War and Maj. Gen. Leonard Wood, United States Army, had just arrived in Dayton, myself representing the Public Health Service, and Dr. F. W. McCampbell, secretary of the Ohio Board of Health. Dr. Ewing, a local practitioner, was selected to be executive officer acting under direction of the commission. The flooded district having been divided into 16 sanitary subdivisions, representative practitioners were selected to act as district inspectors, who in turn were instructed to select such volunteer assistance and authorized to employ such foremen, laborers, and teams as the extent and condition of their districts would necessitate.

In company with Dr. Ewing I called upon those who were selected to act as district inspectors and issued such instructions as the occasion seemed to demand. Their active cooperation in each instance was assured. Upon the establishment of this system it was apparent that the work of sanitation would proceed automatically, and upon the receipt of verbal instruction from the Surgeon General I departed for Zanesville, Ohio, and after considerable delay on account of washouts arrived the 31st ultimo at 5 p. m. I immediately conferred with Dr. G. W. McCormick, local health officer, and Dr. F. G. Boudreau, epidemiologist of the Ohio State Board of Health, who had preceded me by several days and pending his enforced delay of entering into the city had assumed charge of a threatening smallpox situation in the outlying districts. In company with H. T. Sutton, a local practitioner and member of the Ohio State Board of Health, I made an inspection of the flooded districts and found conditions in many respects similar to those noted prevalent at Dayton. The flooded district was found to be surrounded by hilly country to which many inhabitants fled as the water encroached upon their homes. This district immediately surrounded the confluence of the Licking and Muskingum Rivers. The subsidence of the water left the bodies of many drowned animals exposed, and much fecal matter and other organic wastes which had been washed out of the cesspools or had been deposited since by those who were engaged in cleaning out their homes. The property loss was extensive, but it was impossible to estimate the loss of human life, though it was apparent that many bodies must have lodged in the wreckage which was as yet undisturbed. The pumping station was entirely submerged, and there was therefore no supply of water on hand for drinking or flushing purposes. It was evident the establishment of the supply of river water constituted a serious menace to the health of the city as its source, the Muskingum River, drained a watershed known to have been infected with typhoid-fever cases for some time past. A number of scattered cases of smallpox were visited chiefly in those districts west of the river and south of the city proper. Some of these were refugees and had established many contacts when seen. Several cases of scarlet fever and diphtheria were reported by local practitioners, who stated the danger of spread through contacts which existing housing conditions rendered unavoidable. It was estimated that 10,000 people were homeless and these were being provided for in schoolhouses and other buildings through the efforts of the citizens' relief committee assisted by the Ohio State Militia.

Upon my return from this survey a plan of sanitation was drawn up and immediately put into effect. The office of chief sanitary officer was established with headquarters at the city hall, with a system of files and necessary printed forms. The personnel of this office was as follows: Dr. G. W. McCormick, chief sanitary officer, previously local health officer; Dr. E. G. Boudreau, State epidemiologist, associate sanitary officer; Dr. H. T. Sutton, advisory sanitary officer; and myself, in an advisory capacity. The city was divided into seven districts and local practitioners established as district and assistant district inspectors. They were furnished with printed forms, "Sanitary reports," upon which they were to report all insanitary features prevalent in their district after a daily house-to-house inspection. Such recommendations as were made were immediately considered by the sanitary office and duplicate "abatement requests" were issued to the department of public works. Upon the completion of such work as was requested of the department of public works, the duplicate order was so indorsed and returned to the office of the chief sanitary officer for filing. This plan met with the hearty cooperation of the local medical fraternity, both district inspectors, and others, and with the department of public works, which was charged with the duty of carrying out such sanitary orders as were issued to them by the office of the chief sanitary officer. The cooperation of the department of public works was of inestimable value in rapidly clearing up such nuisances and conditions as were reported to the central office by the district inspectors. The reports of the district inspectors were delivered daily in person at 4 p. m. at the central office, so that a full discussion of the needs of the city might be had. These discussions accomplished much good and were responsible to a great degree for the effectiveness of the work of the sanitary service.

It was early apparent that the establishment of the usual supply of drinking water constituted a serious menace to the health of the city. Accordingly telegrams were sent to near-by towns requesting the loan of tank wagons. Ten of these were immediately equipped with the necessary cocks and a systematic delivery service of safe water was instituted. At first only such water as had been treated in the tanks with steam jets was delivered. At a later period a number of driven wells were located which, with a quantity of distilled water which now became available, constituted a supply of clear, pure water sufficient for the needs of the city. In the course of the work it became necessary to construct many public latrines and outhouses, some of which were placed over the manholes in the street to dispose of fecal matter and other organic refuse which was fast accumulating. All dead animals were collected and disposed of at a local reduction plant. By this time 10 carloads of sacked lime had been received and orders were issued to distribute it at street intersections, making it immediately available for use by those who were permitted to return to their homes to care for their property and assist in the cleaning-up process. The issuance of this order permitting the people to return to their homes for the purpose of cleaning up was a source of great satisfaction to them and assisted the work of the public works department very materially. The presence of scattered cases of smallpox, scarlet fever, and diphtheria made it necessary to establish temporary hospitals for isolating cases of disease of this nature. The local pesthouse was utilized for the care of smallpox cases, and two army hospital tents were erected and equipped at the County Fair Grounds for the reception of other contagious diseases. The local health department assumed direct charge of this work and were held responsible to the chief sanitary officer.

Daily bulletins of a public-health nature were prepared by the sanitary office and published in the local newspapers, which insured their wide distribution. These requested the cooperation of the people in expediting all sanitary measures and dealt with the proper disposal of wastes, liming of property, etc., and urged the acceptance of smallpox and typhoid prophylactic vaccination and other procedures deemed advisable for the maintenance of the health of the community. Upon my departure from Cleveland I carried with me the entire available supply of typhoid vaccine of a local laboratory, and this was placed at the disposal of the sanitary office, district inspectors, and local practitioners after the method of administration had been demonstrated. There were many indications prior to my departure from Zanesville that the opportunity of securing protective vaccination offered by this means would be accepted by many inhabitants of the city. A number of inoculations were made at the office and many inquiries as to its protective value were made of the district inspectors and local practitioners.

Upon my departure for Cleveland on the evening of the 4th instant, the entire system of sanitation appeared to be working automatically, and its continuance was assured by the harmonious cooperation of the department of public works and others with the sanitary office.

On April 2, 1913, Surg. J. O. Cobb and Passed Asst. Surg. Hugh de Valin, and Interne Carl Michel were ordered to proceed to the flooded districts of Indiana and assist the local health officers and boards of health in the sanitation of the respective cities.

In pursuance of these instructions these officers visited certain points in Indiana, and submitted their reports on the same as follows:

REPORT OF SURG. J. O. COBB.

I have the honor to state that upon receiving a telegram from the secretary of the State board of health, requesting me to come and bring all the help I could, I took with me Passed Asst. Surg. Hugh de Valin and Interne Carl Michel, and we arrived in Indianapolis on the evening of Friday, March 28, and immediately reported by telephone to J. N. Hurty, the secretary of the State board of health. The next day the city health officers asked that Dr. de Valin be assigned to assist them to help organize their sanitary measures in the flooded districts, and that Dr. Michel be detailed for bacterial examinations of the wells in the flooded sections. Dr. Hurty willingly acceded to this request, and Drs. de Valin and Michel immediately went to work. Shortly afterwards Dr. de Valin was withdrawn and sent to Logansport and Peru, where he was badly needed, and Dr. Michel was moved from the city to the laboratory, where everything moved smoothly and expeditiously. In the meantime Dr. Hurty asked me to go to Brookville to look over that section. Brookville had been badly damaged by the flood and for several days entirely cut off from outside communication. To reach the town, one had to relay by automobile or team, as the railroad in the valley had been almost entirely washed away between Connersville, 20 miles north of Brookville, to Cincinnati.

While the property damage was enormous, and in no way exaggerated by newspaper reports, the loss of life nevertheless was only 15 drowned in this town. And, too, the sanitary problem here was easily controlled, because the wells, where there were wells, were probably not contaminated, and the cisterns were completely put out of commission because they were filled with sand and mud, necessitating that they be cleaned out before using. As the town was small those who live on high ground took the flood sufferers right into their homes, and within a few hours every sufferer was housed, fed, and clothed. The intelligent handling of the situation from every standpoint, sanitary as well as relief measures, deserves high commendation.

The relief committee, the health officer, and other citizens called upon me at the hotel, and the whole situation was discussed. There was no sanitary precaution that they had not already put in operation.

There was considerable property damage to other towns in this section, but the conditions did not call for a sanitary survey.

While on this trip I learned that Dayton could be reached from the west by country road, but while trying to find an automobile to take me in, a party in a machine came through from there and reported that Maj. Dupy, of the Army, had gotten through with a relief corps and wagons, so I went back to Indianapolis and from there to Terre Haute, at Dr. Hurty's request.

Terre Haute was visited by a severe tornado on the day before the flood, which wrecked a section of the city about three blocks wide and eight blocks long, leaving the buildings scattered like kindling. Then the flood followed, which ruined the homes of about 600 people in the little platted town of Taylorsville, which is across the river, just outside the city limits. The town, with all its social and sanitary problems, has always been a constant menace to Terre Haute; and now that the flood has so damaged the ground and ruined its shacks, the city should wipe the place off the map, for it is low and subject to floods, in fact is flooded every year, and the inhabitants should be compelled to live elsewhere.

Together with the county health commissioner and Mr. Owen, of the State board of health, I inspected the ruins of Taylorsville, on the 3d, and that evening spoke at a mass meeting of citizens and officials of Terre Haute, called for the purpose of discussing the sanitary situation of Taylorsville.

It was acknowledged by all the speakers that Taylorsville had now become a sanitary impossibility and that it was an opportune time to condemn the place, and pay the owners a reasonable price for their property.

Dr. Hurty and I reported the general condition to the governor, and he requested that we go back and make a complete sanitary survey. In the meantime Dr. Hurty sustained the order enforcing a strict quarantine on the place and Dr. Shaley, the county health commissioner, put the order in operation, to the effect that no one could come back into his house until the premises were pronounced safe by the health officer. All the data were given to the governor, but just what will be the final disposition of a hard sanitary problem can not be foreseen.

REPORT OF PASSED ASST. SURG. HUGH DE VALIN.

At the request of Dr. J. N. Hurty, secretary of the Indiana State Board of Health, I proceeded to Logansport, Ind., on March 31, 1913, and to Peru, Ind., on April 2, 1913, to assist the local health officers and boards of health in the sanitation of the respective cities, returning to Chicago on April 7, 1913.

From a sanitary standpoint, the conditions resulting from the recent flood were practically alike in both cities, so the same general plan of operations was followed in each place.

A sanitary headquarters was established at a convenient point in each city and organization of forces instituted so that business could be conducted with system and dispatch.

In both cities the major portion of the affected districts depends almost entirely on well water for drinking purposes, the distribution of city water being limited to the business and better class of residence sections. These individual household wells are of different types, generally driven, bored, or dug, probably the largest number being driven, and vary in depth from very shallow to several hundred feet. As practically all had been flooded by water filled with every kind of sewage and refuse, there was great probability of extensive pollution of this source of drinking-water supply.

In view of the fact that there was no other supply of unpolluted water immediately available for the districts depending on individual wells, it was not considered feasible to institute a general closing, though an endeavor was made to condemn those wells which gave indication of being undoubtedly dangerous.

The water company of Logansport takes its supply for the city mains directly from the river and distributes it without previous filtration. In Peru the city supply is drawn from deep wells and ordinarily is probably free from danger. On account of the flood, however, both city supplies were considered polluted with sewage. An emergency hypochlorite outfit was installed at the water plant in Logansport and chloride of lime was used in the waterworks supply wells at Peru.

In addition, in order to overcome as far as possible the tendency of the public to use unboiled water from polluted sources, a vigorous campaign of instruction as to the absolute necessity for the boiling of all drinking water was maintained through the medium of the daily press, distribution of handbills, etc.

A large number of the houses in the flood-affected districts have no sewer connections, outside privies being used for the disposal of human sewage. As a result of the flood, hardly any of the privies were undamaged, in a great many instances the wooden structures were swept away or destroyed, and the vaults obliterated. Many vaults contained more or less fecal matter exposed to easy access by flies, and the majority of the privies which were still standing and in use were very insanitary. There was a tendency in some places, on account of immediate necessity, to either erect some temporary sort of structure or to use other buildings, such as barns, etc., for toilet purposes. Under the circumstances there was very careless disposal of human excreta.

In order to provide proper places for public use, gangs of men were sent into the various neighborhoods to reconstruct a number of privies as soon as possible.

A large quantity of unslaked lime was immediately secured and a supply of it kept on hand at various points, whence it was distributed freely to all. Through the press, handbills, house-to-house inspection, etc., the people were directed to make free use of the lime about their premises, especially in privies and in places where garbage and other refuse had been scattered. Liming squads were sent into the worst districts to properly treat privies, etc.

There were a great many dead animals of various kinds lying about, as also quantities of garbage and other vegetable refuse, so rapid collection and disposal by burning and dumping outside the city limits was instituted as soon as possible.

A supply of antityphoid vaccine was obtained and a general vaccination of the citizens begun. Though under the existing laws it could not be made compulsory, the value of this form of protection and the necessity that it be immediately taken advantage of by everyone, was vigorously presented to the public mind through all available channels. Suitable headquarters for the administration of the treatment was selected, and the local physicians volunteered their services, regular hours with one or more physicians and nurses on duty, etc., being arranged. Judging from the number who were applying for vaccination when I left Peru, the response on the part of the public promised to be more ready than was at first hoped for.

The aid rendered by the State militia, especially the sanitary corps, was invaluable, as with such a trained, organized force it was possible to at once institute a thorough inspection and policing of the affected districts and enforce the sanitary measures which were so imperative at the time. The effective work of the detachment of 20 men of the sanitary corps under the able command of Capt. A. G. Chittick, Medical Corps, Indiana National Guard, in Peru, markedly facilitated the work of sanitation in that city.

Through his knowledge of local conditions and hearty cooperation, Mr. Frank Tucker, State pure-food inspector, who was sent to Logansport and Peru by Dr. Hurty, materially aided in the planning of operations and detail of organization.

Circumstances resulting from the flood, and certain local conditions made it impossible to absolutely control the question of drinking-water supply or to immediately inaugurate any extensive campaign for a general cleaning up and sanitation, efforts being chiefly made to carry out certain essentials and to bring to the attention of the citizens the necessity for their cooperation and observance of specified precautions.

On my personal inspections of the cities just before my return to Chicago, I noted that instructions were being generally observed and the people were making marked progress in cleaning up their premises and rehabilitating their homes.

The hearty reception and support I received from the State authorities, city officials, and local relief committees, not only greatly facilitated the progress of my work, but made my stay in their respective cities very pleasant.

I commenced work at the Indianapolis city laboratory, but owing to the inadequate help furnished by the city, and at the request of the State board of health, I was established in the State laboratories. Samples were collected from all the wells in the flooded district, at the rate of 100 per day. A tag was placed on each pump stating that the water should not be used until analyzed by the State board of health; if, after analysis, the wells were found to be polluted, they were to be sealed. Reports of the analyses were given to the State and city boards daily, and the polluted wells were sealed.

West Indianapolis is located on the west side of White River, on a level with the river, protected somewhat from floods by a levee along the river front. Its inhabitants are people of the working class, living in frame dwellings. The water supply for these houses is from cisterns and from driven wells varying from 30 to 60 feet in depth. About 30 to 40 feet from the wells are privies, with cesspools 6 to 8 feet deep. There are about 1,500 wells in the flooded districts of West Indianapolis.

Samples of water were collected in sterile bottles and analyzed daily. The water was plated on litmus-lactose-agar, and counts made. Out of 600 wells examined 238 gave presumptive tests for colon, indicating contamination with sewage. City reports show that this condition existed to some extent prior to the flood, owing to the geological formation of the land, location of privies, and probable leakage of water pipes due to corrosion near the surface. Examinations of the city water supply were made daily and after a week were found to be negative.

On April 10 I visited Gosport, and here conditions were found to be good, only the rural districts being affected by the flood.

I then proceeded to New Albany and Jeffersonville, via Louisville, with smallpox and antityphoid vaccine furnished by the State board of health. Arriving at Jeffersonville, I conferred with the health authorities and visited several cases of smallpox, and assisted in vaccination. These cases were undoubtedly due to the laxness of enforcement of quarantine regulations. The epidemic was not serious. The city was in no way affected by the flood, and the water supply was good. No new cases developing, I proceeded to New Albany.

The lower part of the city had been flooded, and authorities were at work cleaning and fumigating the houses. No outside relief was needed. Sixteen cases of smallpox had been reported during the last week. I visited, and found all cases to be under quarantine. The city board of health passed an ordinance closing schools until all children were vaccinated. About 2,400 vaccinations were made in four days.

The water supply was found to be in very poor condition. The water is pumped from the Ohio River below Louisville into tanks holding 500,000 gallons, located 300 feet above the river level. The water is passed through three settling tanks, and from there, without chemical treatment or filtration, into the city mains, giving a pressure of 85 pounds. At the time of my visit to the water tanks the water was very muddy and examination showed it to be polluted. The water company attempted to remedy this by pouring in a few bucketsful of calcium hypochlorite, without any respect to proportions. The bottom of the tanks were covered with mud about a foot in thickness, and were in bad condition. Three cases of typhoid fever developed in the city and antityphoid vaccination was commenced. The situation being well under control by the city authorities, I returned to Indianapolis, via Louisville, for the purpose of reporting conditions to Dr. Hurty. Having completed all work assigned, on April 13 I returned to my station at Chicago, as directed.

SANITATION IN THE FLOODED DISTRICTS OF KENTUCKY.

On April 2, 1913, an urgent telegraphic request was received from the local health authorities of Catlettsburg, Ky., to send an officer to assist in sanitation in the flooded districts of that vicinity. Surg. L. L. Lumsden was detailed for the duty, and arrived in Catlettsburg on the morning of April 4. Upon arrival, and in accordance with instructions from the bureau, Surg. Lumsden conferred with the local authorities about the sanitary situation in Catlettsburg, and communicated to the secretary of the State board of health his desire to cooperate with State and local authorities in the enforcement of such measures as might be necessary to prevent the spread of infectious diseases in interstate traffic. He was at once placed practically in charge of the work in Catlettsburg, and later, on request of the State health authorities, was detailed to visit other flood-stricken towns and cities for the purpose of making sanitary inspections and advising with the local authorities. The places visited by him included Maysville, Paducah, Wickliffe, and Columbus. Duty in these several places was continued until April 19. A full report of the work done in this region was published in the Weekly Public Health Reports of June 13, 1913.

SANITATION AND EMERGENCY HOSPITAL WORK OF THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION.

On March 31, 1913, the Secretary of the Treasury approved the request of the president of the Panama-Pacific International Exposition that the Public Health Service be authorized and directed to provide for and make the necessary arrangements for the sanitation and emergency hospital work of the exposition. For this purpose Surgs. R. M. Woodward and J. D. Long have been directed to confer with the exposition authorities relative to the execution of these important duties.

Dr. Woodward reports that he is gathering necessary data and making lists of necessary equipment, but has not yet completed plans for properly carrying out the work. He states that there are at present a large force of workmen now employed on the grounds, and that shortly this force will be increased, and that there will be more necessity for emergency hospital work during the construction period than after the exposition is actually opened.

Dr. Woodward has submitted plans for equipping and conducting the hospital, and has suggested a number of novel ideas for the hospital.

Beginning with the World's Columbian Exposition at Chicago in 1893, the department, through this service, has exercised control over the sanitation of all of the great international expositions which have been held in this country. This has been done in the interest of the prevention of the interstate spread of disease, because it has been felt that the congregation of so many people from the various parts of the nation without sanitary control might result in the propagation of communicable disease. This work has been accomplished without expense to the General Government except for the salaries and expenses of the officers detailed for this purpose. It is believed that, aside from the protection which has been thus afforded to the health of the visitors to the exposition, this work has had a certain educational value.

SANITARY REPORTS AND STATISTICS.

PUBLIC HEALTH REPORTS.

Pursuant to the acts of Congress approved February 15, 1893, and August 14, 1912, the Public Health Reports have continued to be issued weekly during the year. They have given each week current information of the prevalence of communicable diseases and the occurrence of epidemics. They have shown the sanitary laws and regulations being adopted by States and cities and have contained special articles and reports on related subjects of interest to health workers. The information which they have contained is important in adding to the efficiency of health administration throughout the country. It has been information which was not being furnished by other sources, and which could not be so furnished advantageously or properly. The law above referred to, approved in 1893, specifies that public-health information such as that contained in the Public Health Reports shall be supplied to State and local health authorities. An earnest effort has been made to send the reports to all health officers who wanted them and would put them to proper use. It has seemed that there would be no advantage in sending the reports to health authorities who would not use them. However, the growing interest in the publication shown by health officers has been very gratifying, and as a result the weekly edition has had to be increased from 4,500 to 8,600 copies.

The sanitary information published in the Public Health Reports is divided into the following five departments:

1. Prevalence of disease (giving the prevalence and geographic distribution of the preventable diseases in the United States).
2. Sanitary legislation.
3. Foreign reports (giving information of the prevalence of disease and important sanitary measures in foreign countries).
4. Special articles of interest to health officers.
5. Supplements (containing articles relating to the public health of interest and educational value to the public in general and written for this purpose).

PREVALENCE OF DISEASE IN THE UNITED STATES.

The information published in regard to the prevalence of communicable diseases in the United States is collated from reports received from State departments of health, city health authorities, and in some cases from service officers. In many localities cases of the communicable diseases are not required by law to be reported, or, as occasionally happens, the laws requiring notification of disease are not enforced. In such instances the health authorities are naturally unable to keep the bureau informed of the prevalence of diseases dangerous to the public health and liable to spread in interstate traffic.

REPORTS BY OFFICERS OF THE PUBLIC HEALTH SERVICE.

Wherever officers of the Public Health Service are on duty in localities where these conditions exist, advantage has been taken of their presence to secure regular reports of the prevalence of disease. For this purpose the following circular letter was sent to all medical officers:

Bureau Circular Letter No. 1.

TREASURY DEPARTMENT,
BUREAU OF THE PUBLIC HEALTH SERVICE,
Washington, January 13, 1913.

To medical officers of the United States Public Health Service:

You are directed to report to the Surgeon General by telegraph whenever cases of cholera, plague, or yellow fever occur, or whenever any other dangerous communicable disease becomes epidemic at any port or place or in the vicinity of any port or place at which you are stationed. You are further directed to report by telegraph weekly thereafter on Saturday the status of the outbreak, giving, whenever possible, the number of cases and deaths known to have occurred during the preceding week and the total number from the beginning of the outbreak. The subsidence or disappearance of the outbreak is also to be reported by telegraph.

RUPERT BLUE,
Surgeon General.

The regulations for the government of the Public Health Service promulgated by the President March 4, 1913, contain the following paragraph:

745. Medical officers stationed in the continental United States shall report to the Surgeon General immediately by telegraph the first occurrence, or reported occurrence, of cases of cholera, yellow fever, plague (human or rodent), typhus fever or Rocky Mountain spotted fever, or of an unusual outbreak or sudden increase in the number of cases of smallpox, typhoid fever, scarlet fever, epidemic poliomyelitis, diphtheria, or epidemic cerebrospinal meningitis, or of any other communicable disease dangerous to the public health at or in the general vicinity of the places at which they may be stationed. The telegraphic report shall be followed by a letter confirming it and giving all known details of the outbreak, including the probable source of the infection and the measures being taken to control the disease. Weekly reports shall be made thereafter on Monday by telegraph, followed by a letter of the progress of the outbreak, the telegraphic report to give the number of cases and of deaths due to the disease reported during the preceding week, and the total number of cases and of deaths reported from the beginning of the outbreak to the date of report.

The reports thus received have served in a general way to give information of important movements of dangerous diseases that would not otherwise be obtainable and, in the absence of definite and accurate information, such as can be obtained only where notification of cases of disease is required and the requirement enforced, have given useful information in connection with the control of the interstate spread of disease required by section 3 of the act approved February 15, 1893.

REPORTS BY MUNICIPAL HEALTH AUTHORITIES.

City health authorities have reported weekly on the prevalence of communicable diseases within their respective jurisdictions. The reports have been made on post-card forms entitled "Municipal weekly morbidity and mortality report of certain diseases." Provision has been made on these forms for the notation of information regarding the notified cases and deaths from diphtheria, measles, scarlet fever, smallpox, tuberculosis, typhoid fever, cerebrospinal meningitis, erysipelas, hookworm disease, leprosy, malaria, mumps, pellagra, pneumonia, poliomyelitis, rabies, tetanus, and whooping cough. These post-card forms have been sent to the health departments of all States in the United States having a population of 10,000 or over according to the census of 1910. Only about 200 of these cities, however, have reported with any degree of regularity. Those that have not reported are chiefly cities in which there is no active health department or in which little attention is being given to the notification of disease.

REPORTS BY STATE HEALTH AUTHORITIES.

The State health departments which have effective organizations and have developed public health administration to the point where they have information of the prevalence of preventable diseases within their respective jurisdictions forward monthly reports of the number of cases of the several diseases notified. The sending of State reports to the Public Health Service has been a subject of active interest on the part of the State health officers. They appreciate the need of having current information of the prevalence of the preventable diseases in neighboring States and even in those more remote for their guidance in taking proper precautions for the protection of their several jurisdictions. The State authorities with knowledge and experience of modern public health administration feel keenly the necessity of knowing of the occurrence and prevalence of disease and the incidence of epidemics, a knowledge that is obtained only through the reporting of cases. This knowledge can be disseminated for the use of the States only when the reports are collated by the Federal Government acting as their common agent. With this in view the Tenth Annual Conference of State Health Authorities with the Public Health Service, required by section 7 of an act of Congress approved July 1, 1902, held in Washington in June, 1912, adopted the following resolution in regard to morbidity reports:

RESOLUTIONS ON MORBIDITY REPORTS.

In order to make available to the health authorities of the States, Territories, and insular possessions of the United States, for their use and guidance in the protection of their respective communities, information regarding the prevalence and geographic distribution of certain diseases, and the occurrence of outbreaks and epidemics, be it resolved:

1. That the health authorities of the States, Territories, and insular possessions of the United States, including the District of Columbia, shall notify the Surgeon General of the Public Health and Marine-Hospital Service immediately by telegraph (collect) and letter upon the occurrence of a case or cases of cholera, yellow fever, typhus fever, plague, or Rocky Mountain spotted or tick fever, giving the number and location of cases, and that said authorities shall render monthly reports of the number of cases notified of smallpox, leprosy, scarlet fever, measles, diphtheria, typhoid fever, poliomyelitis, cerebrospinal meningitis, dysentery, Rocky Mountain spotted or tick fever, and other diseases notifiable in their respective jurisdictions; said monthly reports to be made on or before the 20th day of each month for the preceding calendar month, and to give the distribution of cases of smallpox, leprosy, poliomyelitis, cerebrospinal meningitis, Rocky Mountain spotted or tick fever, and typhoid fever, by counties, or by counties and cities, or by towns (townships), or by towns (townships) and cities; and that when in a State one or more cities are excepted by statute, charter, or otherwise from reporting the occurrence of the notifiable diseases to the State department of health, and the State report therefore is exclusive of cases occurring in such cities, the cities thus excluded shall be enumerated.

2. That upon the occurrence of an unusual outbreak, or in the event of a sudden increase in the number of cases of smallpox, scarlet fever, diphtheria, typhoid fever,

poliomyelitis, cerebrospinal meningitis, or Rocky Mountain spotted or tick fever in any locality, the Surgeon General of the Public Health and Marine-Hospital Service shall be immediately notified by telegraph (collect) and letter of such unusual outbreak or sudden increase.

3. That in the primary notification of smallpox to local health authorities the date when the patient was last vaccinated and whether the disease is of the benign or virulent type shall be stated; that in all outbreaks of smallpox in which one or more deaths occur a report of such data as can be obtained regarding the origin of the first case or cases and the history of the outbreak shall be made to the Surgeon General, after the subsidence of said outbreak; that all reports of cases of smallpox made by the State or other health authorities to the Surgeon General shall be divided into four classes:

(*a*) Those vaccinated within a period of seven years preceding the attack.

(*b*) Those whose last vaccination occurred more than seven years antedating the attack.

(*c*) Those who have never been successfully vaccinated.

(*d*) Those in which no definite history is to be obtained.

4. That in reporting the occurrence of cases of leprosy such data as it is possible to obtain regarding the patient's history shall be given.

5. That the Surgeon General shall, under the direction of the Secretary of the Treasury, pursuant to section 4 of an act approved February 15, 1893, entitled "An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service," compile and publish the reports forwarded in compliance with the foregoing in the Public Health Reports for the information of the health authorities of the several States, Territories, and insular possessions, including the District of Columbia.

In order that the information secured by the collation of the data regarding the occurrence of disease as it occurs in the several States may be of the greatest usefulness, it is highly desirable that the requirements for the notification of disease be uniform and in so far as possible enforced with equal efficiency. This is necessary to make the information equally complete for all States. Also because extensive requirements for the notification of disease in one State and their rigid enforcement would result in a much more complete notification and record of cases of disease in that State than in other States where the requirements were less complete or less rigidly enforced. Consequently it might appear that the State in which the most active and efficient health administration was being carried on had more cases and a greater prevalence of the preventable diseases than neighboring States where the health departments were less active and less efficient. This result would be apparent and not real and would be due to the fact that the one State had an accurate knowledge of the occurrence and prevalence of those diseases within its jurisdiction, whereas the neighboring States did not. To correct in so far as possible this lack of uniformity existing at the present time, both in the extent of the requirements of the several States for the notification of preventable diseases and the enforcement of these requirements, the Annual Conference of Health Authorities with the Public Health Service, previously referred to, in June, 1913, adopted a draft of a model State law for the notification of cases of preventable diseases. The original draft of the law was prepared by a committee composed of the executive health officers of Massachusetts, Kansas, Virginia, California, and Michigan, and a representative of the Public Health Service. In open conference the draft, as presented by this committee, was the subject of detailed discussion and certain desirable amendments were made. The model law as formally adopted by the conference was as follows:

MODEL STATE LAW FOR MORBIDITY REPORTS.

A BILL To provide for the notification of the occurrence and prevalence of certain diseases.

Be it enacted by the Senate and General Assembly of the State of ———:

SECTION 1. It shall be, and is hereby, made the duty of the State department of health (or commissioner or board of health) to keep currently informed of the occurrence, geographic distribution, and prevalence of the preventable diseases throughout the State, and for this purpose there shall be established in the State department of health a bureau (or division) of sanitary reports which shall, under the direction of the State commissioner of health (State health officer or secretary of the State board of health), be in charge of an assistant commissioner of health who shall receive an annual salary of ——— dollars and the necessary expenses incurred in the performance of his duties. The State department of health shall provide such clerical and other assistance as may be necessary for the establishment and maintenance of said bureau.

SEC. 2. The following-named diseases and disabilities are hereby made notifiable and the occurrence of cases shall be reported as herein provided:

GROUP I.—*Infectious diseases.*

Actinomycosis.
Anthrax.
Chicken pox.
Cholera, Asiatic (also cholera nostras when Asiatic cholera is present or its importation threatened).
Continued fever lasting seven days.
Dengue.
Diphtheria.
Dysentery:
  (*a*) Amebic.
  (*b*) Bacillary.
Favus.
German measles.
Glanders.
Hookworm disease.
Leprosy.
Malaria.
Measles.
Meningitis:
  (*a*) Epidemic cerebrospinal.
  (*b*) Tuberculous.
Mumps.
Ophthalmia neonatorum (conjunctivitis of newborn infants).
Paragonimiasis (endemic hemoptysis).
Paratyphoid fever.
Plague.
Pneumonia (acute).
Poliomyelitis (acute infectious).
Rabies.
Rocky Mountain spotted or tick fever.
Scarlet fever.
Septic sore throat.
Smallpox.
Tetanus.
Trachoma.
Trichinosis.
Tuberculosis (all forms, the organ or part affected in each case to be specified).
Typhoid fever.
Typhus fever.
Whooping cough.
Yellow fever.

GROUP II.—*Occupational diseases and injuries.*

Arsenic poisoning.
Brass poisoning.
Carbon monoxide poisoning.
Lead poisoning.
Mercury poisoning.

Natural-gas poisoning.
Phosphorus poisoning.
Wood-alcohol poisoning.
Naphtha poisoning.
Bisulphide of carbon poisoning.
Dinitrobenzine poisoning.
Caisson disease (compressed-air illness).
Any other disease or disability contracted as a result of the nature of the person's employment.

GROUP III.—*Venereal diseases.*

Gonoccoccus infection.
Syphilis.

GROUP IV.—*Diseases of unknown origin.*

Pellagra.
Cancer.

Provided, That the State department of health (or board of health) may from time to time, in its discretion, declare additional diseases notifiable and subject to the provisions of this act.

SEC. 3. Each and every physician practicing in the State of ——— who treats or examines any person suffering from or afflicted with, or suspected to be suffering from or afflicted with, any one of the notifiable diseases shall immediately report such case of notifiable disease in writing to the local health authority having jurisdiction. Said report shall be forwarded either by mail or by special messenger and shall give the following information:

1. The date when the report is made.
2. The name of the disease or suspected disease.
3. The name, age, sex, color, occupation, address, and school attended or place of employment of patient.
4. Number of adults and of children in the household.
5. Source or probable source of infection or the origin or probable origin of the disease.
6. Name and address of the reporting physician.

Provided, That if the disease is, or is suspected to be, smallpox, the report shall, in addition, show whether the disease is of the mild or virulent type and whether the patient has ever been successfully vaccinated, and, if the patient has been successfully vaccinated, the number of times and dates or approximate dates of such vaccination; and if the disease is, or is suspected to be, cholera, diphtheria, plague, scarlet fever, smallpox, or yellow fever, the physician shall, in addition to the written report, give immediate notice of the case to the local health authority in the most expeditious manner available; and if the disease is, or is suspected to be, typhoid fever, scarlet fever, diphtheria, or septic sore throat, the report shall also show whether the patient has been, or any member of the household in which the patient resides, is engaged or employed in the handling of milk for sale or preliminary to sale: *And provided further,* That in the reports of cases of the venereal diseases the name and address of the patient need not be given.

SEC. 4. The requirements of the preceding section shall be applicable to physicians attending patients ill with any of the notifiable diseases in hospitals, asylums, or other institutions, public or private: *Provided,* That the superintendent or other person in charge of any such hospital, asylum, or other institution in which the sick are cared for may, with the written consent of the local health officer (or board of health) having jurisdiction, report in the place of the attending physician or physicians the cases of notifiable diseases and disabilities occurring in or admitted to said hospital, asylum, or other institution in the same manner as that prescribed for physicians.

SEC. 5. Whenever a person is known, or is suspected, to be afflicted with a notifiable disease, or whenever the eyes of an infant under two weeks of age become reddened, inflamed, or swollen, or contain an unnatural discharge, and no physician is in attendance, an immediate report of the existence of the case shall be made to the local health officer by the midwife, nurse, attendant, or other person in charge of the patient.

SEC. 6. Teachers or other persons employed in, or in charge of, public or private schools, including Sunday schools, shall report immediately to the local health officer each and every known or suspected case of a notifiable disease in persons attending or employed in their respective schools.

SEC. 7. The written reports of cases of the notifiable disease required by this act of physicians shall be made upon blanks supplied for the purpose, through the local health authorities, by the State department of health. These blanks shall conform to that adopted and approved by the State and Territorial health authorities in conference with the United States Public Health Service.

SEC. 8. Local health officers or boards of health shall within seven days after the receipt by them of reports of cases of the notifiable diseases forward by mail to the State department of health the original written reports made by physicians, after first having transcribed the information given in the respective reports in a book or other form of record for the permanent files of the local health office. On each report thus forwarded the local health officer shall state whether the case to which the report pertains was visited or otherwise investigated by a representative of the local health office and whether measures were taken to prevent the spread of the disease or the occurrence of additional cases.

SEC. 9. Local health officers or boards of health shall, in addition to the provisions of section 8, report to the State department of health in such manner and at such times as the State department of health may require by regulation the number of new cases of each of the notifiable diseases reported to said local health officers or boards of health.

SEC. 10. Whenever there occurs within the jurisdiction of a local health officer or board of health an epidemic of a notifiable disease, the local health officer or board of health shall, within 30 days after the epidemic shall have subsided, make a report to the State department of health of the number of cases occurring in the epidemic, the number of cases terminating fatally, the origin of the epidemic, and the means by which the disease was spread: *Provided*, That whenever the State department of health has taken charge of the control and suppression or undertaken the investigation of the epidemic, the local health authority having jurisdiction need not make the report otherwise required.

SEC. 11. No person shall be appointed to the position of local health officer in any city, town, or county until after the qualifications of said person have been approved by the State department of health.

SEC. 12. In localities in which there are no local health officers or boards of health and in localities in which, although there are health officers or boards of health, adequate provision has not, in the opinion of the State department of health, been made for the proper notification, investigation, and control of notifiable disease, and in localities in which the local health authorities fail to carry out the provisions of this act, the State department of health shall appoint properly qualified sanitary officers to act as local health officers and to prevent the spread of disease in and from such localities and to enforce the provisions of this act: *Provided*, That salaries and other expenses incurred under the provisions of this section shall be paid by the local authorities.

SEC. 13. Any physician or other person or persons who shall fail, neglect, or refuse to comply with, or who shall violate any of the provisions of this act, shall be guilty of a misdemeanor, and upon conviction thereof shall be sentenced to pay a fine of not less than ——— dollars nor more than ——— dollars or to imprisonment for not less than ——— days nor more than ——— days for each offense: *Provided*, That in the case of a physician his license to practice medicine within the State may be revoked in accordance with existing statutory provisions.

SEC. 14. No license to practice medicine shall be issued to any person until after the applicant shall have filed with the State licensing board a statement, signed and sworn to before a notary or other officer qualified to administer oaths, that said applicant has familiarized himself with the requirements of this act, a copy of which sworn statement shall be forwarded to the State department of health.

SEC. 15. Each and every person engaged in the practice of medicine shall display in a prominent place in his or her office a card upon which sections 2, 3, 4, 7, 13, 14, and 15 of this act have been printed with type not smaller than 10-point. A similar card shall be displayed in a prominent place in the office of each and every hospital, asylum, or other public or private institution for the treatment of the sick. These cards shall each be not less than 1 square foot in size and shall be furnished to institutions and licensed physicians without cost by the State department of health.

SEC. 16. The sum of ——— dollars is hereby appropriated from any money in the State treasury not otherwise appropriated for carrying out the provisions of this act.

SEC. 17. This act shall take effect immediately and all acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

The following model notification blank for cases of sickness was also adopted by the conference and is the one referred to in section 7 of preceding model law. This blank is intended to be printed on a post card.

NOTIFICATION BLANK.

[Face of card.]

......................, 191...
(Date.)

Disease or suspected disease..
Patient's name............, age............, sex............, color...............
Patient's address............................, occupation.........................
School attended or place of employment...
Number in household: Adults...................., children.........................
Probable source of infection or origin of disease..................................
If disease is smallpox, type..................., number of times successfully vaccinated and approximate dates...
If typhoid fever, scarlet fever, diphtheria, or septic sore throat, was patient, or is any member of household engaged in the production or handling of milk.............
Address of reporting physician..
Signature of physician..

[Reverse of card.]

For use of local health department.

.............., 191..
(Date.)

Was case investigated by health department?..........
....
Was nature of disease verified?........
....
What measures were taken to prevent the spread or the occurrence of additional cases from same origin?............
....

Health Department.
(City)...............
(State)................

REPORTS OF SICKNESS—THEIR PURPOSE.

The significance of the resolution and of the model State law for morbidity reports adopted by the official conference of United States health authorities is readily appreciated when it is understood that the accomplishment of effective public-health work depends largely upon the use of information obtained from the notification of cases of the preventable diseases; that adequate notification shows the occurrence, prevalence, and geographic distribution of these diseases; and that without this knowledge attempts at their control are to varying degrees ineffective and the proper protection of the health of the community is impossible.

Originally the duties of the health officer were very simple, and related only to the control of certain diseases associated with popular dread. As knowledge, however, of the causes of diseases and their means of spread has been acquired, the responsibilities of the health department have rapidly increased, so that at the present time the health department is properly the guardian of the community's health in so far as health can be conserved by the prevention or control of disease.

Only those diseases may be properly classed as preventable or controllable of which something is known of the cause or means of spread. Given this knowledge, the first and essential step in their prevention or control is the securing of information of the occurrence and location of the factors that produce disease and of the foci from which disease may spread. Of the communicable diseases a knowledge of the existence and location of cases is necessary, as each such case constitutes a focus from which the disease may spread. Of the diseases that are preventable but not communicable a knowledge of the occurrence of cases and of the conditions under which they are occurring is necessary, as it shows the existence of the conditions which produce these diseases. This knowledge can be obtained only when the occurrence of cases is made known to some authority—that is, when cases are reported. Any attempt at the prevention of disease will be at best incomplete and in large measure a makeshift unless it is based upon a knowledge of the occurrence and prevalence of disease.

The health department in a community is able to control disease in proportion to the completeness and exactness of its knowledge of the occurrence of cases. With full information of existing cases it can work effectively; it can direct its efforts at prophylaxis against the disease itself; it can work in the light of knowledge of the situation. Without such information its attempts at control must be of a general nature, sometimes effective, more often not, for it is working in the darkness of ignorance of the location and prevalence of that which it is attempting to control. If cases are not reported there may be hundreds of cases of typhoid fever, or infantile paralysis, or scarlet fever, or smallpox in a locality, and the health officer not be aware that there are any present.

Tuberculosis is a communicable disease. With the exception of the relatively small proportion of cases contracted through milk from diseased cows each case is contracted directly or indirectly from some preexisting human case. To control this disease effectively, it is necessary that each case be known to the health department, so that it may ascertain that the patient is not unnecessarily exposing others to infection. Tuberculosis is usually chronic in nature, and those affected frequently remain, for months and sometimes years, foci from which the infection may spread to others. To control this disease the health department should make sure that the patients understand how to so conduct themselves that others may not be infected, and that those associated with the sick know the manner in which the disease is spread and how to protect themselves from it. Then, too, the health department should know of those suffering from tuberculosis, as those so affected, for the protection of the community, should not engage in certain occupations in which they would be especially apt to spread the disease.

Typhoid fever is another disease in which the health department should be informed of the occurrence of each case. Every case of typhoid fever has potential possibilities for harm to the community through the contamination of water, milk, or other food supply. A knowledge of all cases is necessary for the protection of others, for each case is a focus from which, under suitable conditions, an outbreak may arise. When there are a number of cases of this disease, there are usually some one or more sources from which it is being spread, and it is only when cases are reported that the health department can ascertain their relationship to each other or their common source of infection when such exists. It is only through the notification of cases that outbreaks due to infected milk or the infection of a common water supply can be recognized and proper remedies applied or that typhoid-bacillus carriers can be traced and controlled.

Scarlet fever is another common disease in which the need for the notification of cases is universally understood. Every case of this disease comes from some preexisting case. No community would expect and no health department would attempt to control this disease in the absence of the notification of the cases that were occurring. The same is true of plague, yellow fever, and cholera. There are many other diseases, however, in which the importance of the reporting of cases has not been generally appreciated, but in which the necessity is just as great if they are to be prevented. The necessity for notification exists in all preventable diseases. Their causes or methods of spread may be different and the measures necessary to prevent them may vary, but the notification of the occurrence of cases is essential in all for their successful control. The health department can not prevent the spread of disease of the existence of which in the community it is unaware.

For purposes of public-health administration cases of the communicable diseases may be divided into four groups, namely: First, the well-marked cases; second, the mild, concealed cases; third, the mild, unrecognized cases; and, fourth, the well, or apparently well, carriers. To prevent the spread of these diseases control of all four groups is necessary. The control of only the first group by quarantine or other means, a practice by no means uncommon, is of little value in preventing the spread of these diseases, as the well-marked cases usually come less in contact with others than do the cases of the other groups, and are likely, therefore, to be less potent factors in spreading infection. The well-marked cases are presumably usually reported. The mild cases should also be reported. The notification of the cases in the first two groups should enable a well organized health department to discover most of those in the other two by a careful study of the conditions under which the reported cases occur. To find the unrecognized cases and carriers is a prime duty of the health officer. The accomplishment of this requires intelligence and watchfulness and will be possible in proportion to the completeness with which the recognized cases are reported.

But the health department of a city, township, or county needs to know not only of the occurrence and prevalence of disease in its own jurisdiction, but also of the prevalence of disease in neighboring cities, towns, and counties, so that it may be informed of the possibility of the introduction of disease from other communities. The prevalence of infectious diseases in every city and county has an important bearing on the welfare of every other city and county in a State. In a well-organized State, therefore, the local health authorities keep the State health department currently informed of the prevalence of disease in their respective jurisdictions, that the information may be made available to the various local authorities and that the State department, acting in its broader field as the agent and representative of all localities and all the people, may perform its proper functions in the prevention and control of disease. Without the information of the prevalence and geographic distribution of disease obtainable in this way the State health department will remain in ignorance of the sanitary condition of the State, and, because of this lack of knowledge, will be unable to perform its proper functions and will therefore constitute a health department largely in name only.

In addition, a State health department needs for the proper performance of its functions a knowledge of the prevalence of disease more extensive than that of its own State. It needs to know of the prevalence of disease in neighboring States and even in those more remote. It is as necessary that one State should know of the prevalence of disease in other States as that a city should know of the prevalence of disease in surrounding communities. Therefore, to complete the usefulness of the health organization, it is important that the Federal Government collate the reports of cases which show the prevalence of disease in the several States.

SANITARY LEGISLATION IN THE UNITED STATES.

The trend of public hygiene in the United States and the progress being made in its application are in a large measure shown by the activities of States and cities in safeguarding the public health. These activities are indicated by the laws being enacted and the regulations promulgated on matters relating to the public health. In order that information of these activities and of the changes and advances in the sanitation of cities, as shown by the adoption of new ordinances and regulations, might be available to the health officers and public-health workers in general, the publication of ordinances and regulations of municipalities was begun in the Public Health Reports March 24, 1911.

COMPILED MUNICIPAL ORDINANCES AND REGULATIONS.

That they might have a permanent usefulness and be available for reference in a more convenient form, the municipal public-health legislation adopted from January 1, 1910, to June 30, 1911, was collated under subjects, the laws and regulations on the same subjects being grouped together.

A similar collation has been made of the municipal ordinances and regulations adopted from July 1 to December 31, 1911.

The number of ordinances and the various subjects of which they treat is an index of the thought and attention being given to public-health matters.

The value of publishing the municipal sanitary legislation in this way and its bearing on the betterment of sanitary conditions throughout the country are already apparent. As soon as copies of the new sanitary requirements adopted by cities began to appear in the Public Health Reports other cities began making comparisons with their own requirements and enacting new ordinances similar to the better ones appearing in the Public Health Reports. It is apparent that the sanitary ordinances being adopted by cities are on the whole of a better type, being copies of the best laws previously enacted, and that there has been a commendable policy also toward a uniformity in the requirements through the copying in this manner of the better legislation.

STATE LAWS AND REGULATIONS.

Beginning with the issue of the Public Health Reports of November 29, 1912, State sanitary laws and regulations pertaining to the public health have also been currently published. This serves the same purpose in regard to State legislation and State health administration as the publication of municipal legislation is accomplishing for cities. It will undoubtedly have a marked effect in improving the State sanitary requirements and in rendering them more uniform, a condition highly desirable in a country where the responsibility for, and the authority to control, sanitary matters rests to a large extent with the legislative bodies of 48 different commonwealths.

Prevalence of Disease in Foreign Countries.

As in preceding years, it has been necessary to keep currently informed of the prevalence of disease and the incidence of epidemics throughout foreign countries. This has been especially true in regard to the diseases subject to the quarantine regulations promulgated under authority of the act of Congress approved February 15, 1913, i. e., cholera, yellow fever, plague, smallpox, leprosy, and typhus fever. It is patently impossible to carry on an efficient maritime quarantine and prevent the introduction of communicable diseases from foreign countries without definite and current information of the places in foreign countries where these diseases exist or are prevalent. It is only by knowing the ports and localities in which yellow fever is present that proper attention can be given to vessels coming from such infected ports or localities. Likewise it is only by knowing the ports and localities in which plague is present that proper attention can be given to the prevention of the introduction of plague by vessels coming from infected ports.

REPORTS BY AMERICAN CONSULS.

Information of the prevalence of disease abroad is furnished largely through the efficient and intelligent cooperation of the American consuls in foreign countries. These officers of the Department of State report weekly regarding the prevalence of disease in the vicinity of their respective stations, and in the case of outbreaks of such quarantinable diseases as cholera, plague, and yellow fever information is forwarded by telegram. Too much credit can not be given to the importance of the information thus obtained nor to the excellent service being rendered in this way by the State Department through its diplomatic and consular officers in foreign countries. The importance of a service of this kind is appreciated by other nations as well, as is shown by the sanitary convention of Paris, signed in 1903, and the sanitary convention of Washington, signed in 1905, by which the Governments signatory thereto agree to give to each other prompt information of the occurrence of dangerous epidemic diseases (cholera, plague, and yellow fever) in their respective countries.

REPORTS BY OFFICERS OF PUBLIC HEALTH SERVICE.

In supplementing the information obtained through the representatives of the State Department, advantage has been taken of officers of the Public Health Service detailed in foreign countries and also the information given out by the sanitary authorities abroad.

The regulations for the government of the Public Health Service promulgated by the President March 4, 1913, contained the following paragraph:

> 744. Medical officers whenever stationed outside of the continental United States (as it existed Jan, 1, 1898) shall report to the Surgeon General immediately by telegraph the first occurrence, or reported occurrence, of cases of cholera, yellow fever, or plague (human or rodent), or of an unusual outbreak of any other communicable disease dangerous to the public health at or in the general vicinity of the places at which they may be stationed. The telegraphic report shall be followed by a letter confirming it and giving all known details of the outbreak, including the probable source of the infection and the measures being taken to control the disease. Weekly reports shall be made thereafter on Monday, by telegraph, followed by letter, of the progress of the outbreak, the telegraphic report to give the number of cases and of deaths due to the disease reported during the preceding week and the total number of cases and of deaths reported from the beginning of the outbreak to the date of report. The disappearance of the disease or the termination of the outbreak shall also be reported by telegraph.

SPECIAL ARTICLES OF INTEREST TO HEALTH OFFICERS.

Special articles and reports of value to health officers in connection with their work have been published in the Public Health Reports. The usefulness of these reports can undoubtedly be greatly increased along this line, which is essentially one of education. It is difficult to estimate the importance it might become in this way as a factor in raising the standard of local health administration through its serving as a medium for conveying well-selected information regarding the best and most efficient public health practices. There is a need of some means by which the health officer can keep apprised of the excellent research work being done and the facts regarding the results of various measures in health administration. It is impossible for the individual health officer to read the many journals in various languages and the many sanitary reports in which this information is contained. It is quite practicable for a comparatively small force of trained men to follow current literature and abstract that which contains anything new or valuable in connection with the protection of the public health. This material would be valuable to the thousands of busy health officers of States and cities whose time is taken up with the work of their offices. The public health literature thus abstracted could be published in the Public Health Reports, which already goes to the local health officers. The results in the greater efficiency of public health authorities and in the increased knowledge of public health matters possessed by the average local health officer would in this way undoubtedly be considerable.

EDUCATIONAL SUPPLEMENTS.

One factor in the conservation of the public health is the dissemination of information regarding public health matters among the people. Measures for the protection of health can be successfully carried out ordinarily only when the citizen has an intelligent understanding of the reasons for them. With this in mind articles for the popular dissemination of sanitary information have been issued. These have been published as supplements to the Public Health Reports, as they were for general distribution. The following supplements have been issued during the year:

1. Measles. By W. C. Rucker.
2. Indoor Tropics. The Injurious Effect of Overheated Dwellings, Schools, etc. By J. M. Eager.
3. Tuberculosis. Its Predisposing Causes. By F. C. Smith.
4. The Citizen and the Public Health. By A. M. Stimson.
5. Fighting Trim. The Importance of Right Living. By J. M. Eager.
6. Contagious Diseases. Their Prevention and Control in Children's Institutions. By James P. Leake.
7. Shower Bath for Country Houses. A Serviceable and Inexpensive Shower Bath Readily Improvised in Town or Country. By Carroll Fox.

CHOLERA—PREVALENCE DURING THE YEAR.

During the summer of 1912 cholera was not epidemic to any extent outside of Asia and the East Indies. During the year it prevailed to some extent, with a more or less general distribution, in China, India, Indo-China, Japan, Siam, Turkey in Asia, and the Dutch East Indies. There was also an outbreak in Constantinople in Europe and a few scattered cases in Zanzibar, Africa.

During the present year, 1913, cholera has appeared quite extensively in southern Europe. The disease was undoubtedly conveyed from the infected Turkish army to the other armies in the recent Balkan Wars, so that when the various armies returned from the front and were disbanded the disease was widely scattered and many foci of infection were established. Not only did the disease occur in this way in Roumania, Bulgaria, and Servia, but it also extended to Austria-Hungary and to the territory taken from Turkey by the allies. As usual, the disease was present in various points in Asia, among which in China may be especially mentioned Canton and Hongkong. In the Dutch East Indies it was present in Borneo, Java, and Sumatra. In India it was present in numerous places. It was also present in Indo-China, Siam, and the Straits Settlements, and on August 25, 1912, two cases were reported at Manila.

YELLOW FEVER—PREVALENCE DURING THE YEAR.

During the summer and autumn of 1912 yellow fever was reported in South America, Mexico, and West Africa. In South America the disease was reported in Brazil at Ceara, Manaos, and Pernambuco; in Chile in the Toco district and at Tocopilla; in Colombia at Barranquilla; in Ecuador at Bucay, Chobo, Duran, Guayaquil, Milagro, Naranjito, and Yaguachi; in Peru at Iquitos, where it has been endemic for years; in Venezuela at Caracas, La Guaira, Cua, La Victoria, Macuto, Maiquetia, and Victoria. One case arrived July 14, 1912, at Panama on the steamship *Chile*, from Guayaquil. In Mexico it was reported in

Campeche at Carmen; at various places in Tabasco; and in Yucatan at Espita and Merida. In Africa it was reported in Dahomey at Abomey and Porto Novo; and during November in Senegal.

During the first part of the calendar year 1913 yellow fever was reported in South America as follows: In Brazil at Bahia, Manaos, Pernambuco, and Rio de Janeiro; in Colombia at Cartagena; in Ecuador at Babahoyo, Bucay, Duran, Guayaquil, Milagro, and Naranjito; in Venezuela at Caracas; in Mexico at Campeche and Maxcanu. Two cases arrived at Habana on vessels, one July 16 on the steamship *Hydra* from Manaos and one on August 8 on the steamship *Morro Castle;* in the latter case the passenger came from Campeche. In Africa cases were reported in Southern Nigeria at Lagos and Worri.

PLAGUE—PREVALENCE DURING THE YEAR.

The pandemic of plague which began in 1894, starting from its endemic foci in central Asia, has continued to circle the globe, the disease apparently disappearing in some localities in which it has been present and appearing for the first time in others. The disease appears to have followed commerce until practically every locality trading with plague-infected ports in which careful precautions are not made to prevent the introduction of the disease have become involved. While the appearance of plague in man is to some extent an indication of the extent of the disease in rodents, this is not entirely so, as undoubtedly many localities in which no human cases have been reported are infected with rodent plague. The disease has been reported in Asia in Afghanistan, Arabia, China, the Dutch East Indies, India, Indo-China, Japan, Persia, Siam, Straits Settlements, and Turkey in Asia; also in the islands of Mauritius and the Azores.

In Europe there was an outbreak in Russia in the Astrakhan Government and cases arrived on vessels from foreign ports as follows: In Austria-Hungary 1 case arrived at Trieste on the steamship *Amphitrite;* at Hamburg in Germany, 2 cases on the steamship *Bellailsa;* and 1 case at the River Tyne in Great Britain from the same vessel.

In South America plague was reported in Argentina, Brazil, Chile, Ecuador, Peru, and Venezuela; in the Philippine Islands cases occurred at Iloilo and Manila. In Cuba 3 cases and 2 deaths occurred at Habana between July 4 and 27, 1912. In Porto Rico a considerable outbreak began in June, 1912, and lasted through July, August, and well into the month of September. In the island of Trinidad in the West Indies there was an outbreak of 11 reported cases. In Hawaii there were 4 deaths, 3 at Kukuihaele, and 1 at Pepeekeo. Three cases were also reported at Numea in New Caledonia.

During the year 1913 plague was reported in Asia, Arabia, China, India, Indo-China, Persia, Siam, Straits Settlements, Turkey in Asia, the Dutch East Indies, and Japan; in the Philippine Islands 3 cases were reported at Manila during the month of May; in Africa the disease was reported in British East Africa, Dutch East Africa, Egypt, and Tripoli; also in the island of Mauritius. In Europe the disease was again reported in the Government of Astrakhan in Russia. In South America cases were reported in Brazil, Chile, Ecuador, Peru, and Uruguay.

PLAGUE IN PORTO RICO.

A case of plague occurred in San Juan June 10, 1912. This case was not recognized as plague until after burial. By July 7, 31 cases had occurred. At this time the United States Public Health Service took charge of the outbreak, and after this there were but 24 cases, the last one of which occurred on September 13, 1912. Outside of San Juan 3 cases occurred at Carolina and one at Dorado. During the outbreak 66 plague-infected rats were found. For details of this outbreak, see page 195.

SMALLPOX IN THE UNITED STATES.

Smallpox continued prevalent during the calendar year 1912, as it has been for a number of years. The types of the disease also have remained the same—that is, the type generally prevalent has been a mild one, with an average case fatality rate of less than 1 per cent. The virulent form of the disease, however, has appeared in a few places, but no extensive outbreaks of it have occurred. These two types seem to have become quite distinct. In an outbreak of the mild form there are occasional cases which take on a moderate severity—that is, show confluent eruption with confinement of the patient to bed, as occurs in the milder cases of the virulent form of the disease. These severe cases of the mild form, however, seldom terminate fatally, and they seldom, if ever, have the virulent characteristics of the graver form. On the other hand, in the virulent outbreaks there will be found mild cases in persons possessing partial immunity by reason of previous vaccination. The two types, however, the mild and the virulent, breed true to type. The virulent does not seem to develop from the mild nor the mild from the virulent. Mild types of smallpox, similar to that existing in the United States, are present also in Canada and apparently also in certain parts of South America and Africa.

During the calendar year 1911 reports were received by the Public Health Service from the State authorities of 29 States and the District of Columbia regarding the prevalence of smallpox in their respective jurisdictions. In these States there was a total of 21,768 cases and 134 deaths reported.

During the calendar year 1912, reports were received from 33 States, the District of Columbia, and Hawaii, giving a total of 23,204 cases and 301 deaths. The largest numbers of cases were reported from Utah, Minnesota, Washington, North Carolina, Indiana, and Illinois, which had 2,700, 2,320, 1,447, 1,374, 1,182, and 1,204 cases, respectively, notified. The smallest numbers of cases were reported in the District of Columbia, New Jersey, and Maryland, in which 9, 10, and 20 cases, respectively, were notified. The largest number of deaths occurred in Texas, where, although there were only 717 cases notified, there were 126 registered deaths. The next highest number of deaths occurred in Pennsylvania, where, out of 496 notified cases, there were 37 deaths. California had 16 deaths out of 819 reported cases, and Indiana 12 deaths out of 1,182 reported cases. No deaths from the disease were reported in Colorado, Connecticut, the District of Columbia, Maryland, Montana, North Dakota, and Vermont.

Smallpox cases reported by States during the year 1912.

	First quarter.		Second quarter.		Third quarter.		Fourth quarter.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Alabama [1]							111	1	111	1
Arizona	46		4				45		95	15
California	305	2	250	1	138	11	126	2	819	16
Colorado	71		139		21		15		246	
Connecticut	69		247		10		3		329	
District of Columbia			2				7		9	
Florida	576		228	2			17		821	2
Hawaii					6				6	
Illinois	456	4	365	5	108	2	275	1	1,204	12
Indiana [2]	484	5	304	5	46		348	2	1,182	12
Iowa	135		149	1	45		101	1	430	2
Kansas	173	1	76		56	2	55	1	360	4
Maine	219		215	3	70		150	1	654	4
Maryland [3]							20		20	
Massachusetts	29		137		15		37	1	218	1
Michigan									1,127	3
Minnesota	750	3	702		164		704	1	2,320	4
Mississippi [4]	468	2							468	2
Montana	125		59		15		65		264	
New Jersey	3		4	2	1		2		10	2
New York	320	2	98		101		375	2	894	4
North Carolina	859		311		147		[6] 57		1,374	
North Dakota	120		68		27		111		326	
Ohio	208	1	207		106		178		699	1
Oklahoma	138	15	202		15		113		468	15
Oregon	286	2	179		20		213	1	698	3
Pennsylvania	72	2	121		197	30	106	5	496	37
South Dakota	138	1	119		28		90		375	1
Texas	347	56	118	33	76	11	176	26	717	126
Utah	1,013		711	4	241	2	735		2,700	6
Vermont	83		41		20		110		254	
Virginia	447	16	359	3	168		115		1,089	19
Washington	507		274		185		481	1	1,447	1
Wisconsin	236	1	183	1	108	1	284		811	3
Wyoming	143	4	17	1	1		2		163	5
Total	8,826	117	5,889	61	2,135	59	5,227	46	23,204	301

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[1] Report received fourth quarter only.
[2] The health officer states that cases are known not to be completely reported.
[3] Exclusive of Baltimore City.
[4] Report received first quarter only.
[5] The report for the fourth quarter was for the month of October only, as but few of the existing cases were reported to the health authorities after the State ceased to require the quarantining of cases. To note the few cases being reported would, in the opinion of the State health officer, give an entirely erroneous idea regarding the prevalence of the disease in the State.

SMALLPOX—VIRULENT OUTBREAKS.

PITTSBURGH, PA.

An outbreak of the virulent form of smallpox occurred in Pittsburgh, Pa. The outbreak began August 9, 1912, when a boy 12 years of age was found to have the disease, the diagnosis being made during the pustular stage. This boy lived in an alley in the most crowded tenement district. The parent population of this district had practically all been vaccinated, being mainly immigrants. Their children as a rule were unvaccinated.

In the city of Pittsburgh there were 114 cases of smallpox during the outbreak and in Allegheny County, outside of the city of Pittsburgh, 7 cases, making in all 121 cases.

The ages of the patients were as follows:

Ages of patients in Pittsburgh.

	Cases.
Under 1 year	3
1 to 2 years	10
2 to 3 years	7
3 to 4 years	9
4 to 5 years	11
5 to 7 years	19
7 to 10 years	12
10 to 15 years	9
20 to 30 years	14
30 to 40 years	12
40 to 50 years	7
60 years and over	1

Ages of patients outside of Pittsburgh.

	Cases.
2 years	1
22 years	1
24 years	1
30 years	1
35 years (about)	3

The vaccination history of the Pittsburgh patients showed that of the 114 patients 90 had never been vaccinated, while 24 had been. Of the 24 who had been vaccinated 12 had been vaccinated more than 7 years previously and showed well-defined scars, 7 had been vaccinated more than 7 years previously and showed poorly defined scars, 1 had been vaccinated less than 7 years before and showed a well-defined scar, 4 had been vaccinated less than 7 years before and showed ill-defined scars.

Of the 90 cases reported as not previously vaccinated, the type of the disease was severe in 62 cases, moderately severe in 18, and mild in 10 cases. Of the 24 cases previously vaccinated, the type was severe in 1 case, moderately severe in 3, and mild in 20 cases.

Of the 7 cases occurring outside of Pittsburgh, 4 of the patients had never been vaccinated, 1 patient had been vaccinated 23 years previously, and 2 cases within the period of incubation of the disease. A summary of all the cases in the outbreak shows that 94 had never been vaccinated, while 27 had been, but of the latter 2 were vaccinated within the period of incubation.

In the outbreak there were 33 deaths among the 121 patients, giving a case fatality rate of 27.28 per cent. Of the 33 deaths, 31 were among the Pittsburgh patients and 2 among those from outside the city.

Of the 33 deaths 29 were among persons not previously vaccinated. Of the deaths among the vaccinated 1 was of a woman 40 years of age who had an ill-defined vaccination scar resulting from vaccination in childhood, and 1 was that of a woman 85 years of age, who also had an ill-defined scar as a result of vaccination in childhood. This case was extremely mild as to smallpox, but pneumonia developed, causing death.

LOS ANGELES CITY AND COUNTY, CAL.

During November and December, 1911, the virulent type of smallpox appeared in the city of Los Angeles. The first case was found in a district occupied by Mexicans. From March to November, 1911, smallpox had been present in the city during each month. The cases were comparatively few, however, there being only 26 reported. These were all of the benign type of the disease so prevalent throughout the country, and among the 26 cases there was no fatality. During the two months of November and December, 1911, however, the disease appeared in virulent form, and out of the 25 cases reported during these two months, 6 ended fatally. During January, 1912, there were 30 cases with 1 death; during February, 16 cases with 1 death. From March to June, inclusive, there were 32 cases without fatality. During July, however, the disease again appeared in virulent form, and during this month there were 13 cases with 2 deaths. During the first 16 days of August there were 5 deaths. In the neighboring city of Pasadena there were, during the month of July, 3 cases of smallpox with 2 deaths.

In one family in Los Angeles the father and three children, none of whom had ever been vaccinated, were attacked. Three of these cases ended fatally. The mother, who was the only member of the family who had ever been vaccinated, was also the only one who did not contract the disease. None of the other fatal cases in the city were in persons who had ever been successfully vaccinated.

This outbreak is of especial interest, as being an instance of the occurrence of the virulent type of smallpox in a community in which the benign form of the disease had been present more or less continuously for a considerable time.

MISSOURI.

In the Quarterly Bulletin of the Missouri State Board of Health 10 deaths from smallpox are recorded for the six months, April to September, 1912, as follows: One in April, 1 in May, 7 in July, and 1 in August. This is of interest, as it is a larger number of deaths from smallpox than that occurring in most of the other States. Records of the number of cases of smallpox that occurred during this time are not available. No information is obtainable, therefore, of the prevalence of the disease, and it is not known whether the 10 deaths represent 20 cases or 10,000 cases. The history of smallpox in this country and the known marked variation in the case fatality rate of different outbreaks would bring either estimate within the bounds of possibility.

BERKELEY, CAL.

In Berkeley, Cal., 9 cases of smallpox, with 5 deaths, were reported between December 17, 1912, and February 14, 1913.

IMPERIAL COUNTY, CAL.

Eighteen cases of smallpox, with 4 deaths, were notified in Imperial County during the month of January, 1913. From January 1 to June 28, 1913, there was a total of 65 cases with 10 deaths.

WOODVILLE, PA.

There was a small outbreak of virulent smallpox at the Allegheny Home at Woodville during the early part of the year 1913. To February 11 there had been a total of 15 cases with 3 deaths.

HUNT COUNTY, TEX.

In October, 1912, there was a small outbreak of 12 cases, with 3 deaths, in Hunt County. In November there was another small outbreak, with 9 cases and 1 death. Beginning with the early part of December there was an outbreak in which there were in all 127 cases, with 34 deaths. On February 5 the disease was apparently under control, with but 3 cases remaining under treatment.

OKLAHOMA.

In Oklahoma there was a considerable outbreak of virulent smallpox in Choctaw and McCurtain Counties. To February 3 there had been in Choctaw County 82 reported cases, with 21 deaths. Fifty-one of these cases and 17 of the deaths occurred in the town of Hugo. In McCurtain County there had been 31 reported cases, with 10 deaths. There were small numbers of cases in adjoining counties.

Leprosy in the United States.

Leprosy is one of the diseases the occurrence of cases of which the State health authorities report to the Public Health Service, in accordance with the resolution adopted by the Tenth Annual Conference of State and Territorial Health Authorities with the Public Health Service, held in June, 1912. For the making of these reports the following special blank has been prepared:

STATE REPORT BLANK.

State of .... Monthly Report for ...., 191...

LEPROSY.

[Case report.]

Case reported at .... Name, ...
Age, ... Sex, ... Race, ... Born in...........
Has lived at present address for .... Previously lived in ....
And before that in............... Has lived in the United States continuously for
.... Has lived in foreign countries as follows: ....
....

History of leprosy in patient's family or associates: ....
....

The disease was diagnosed clinically ....
(Date.)
and verified bacteriologically ....
(Date.)

Type of disease, ... The patient is under the supervision of

....

and is being controlled as follows: ....

....

....

Remarks: ....

....

....

....

....

....

During the year the occurrence of the following cases of leprosy has been reported by States:

CALIFORNIA.

A case was diagnosed clinically April 1, 1913, in Los Angeles in the person of a Mexican (F. C.), age 40 years. The type of the disease was anæsthetic. The patient left the hospital without notice and all trace of him was lost. During the month of May a case of leprosy was notified at Los Angeles in the person of a Mexican woman who had come to the United States about one year previously and had resided in Los Angeles for about three months. The case was of the anæsthetic type.

During the week ended July 20, 1912, a case of leprosy was reported in San Francisco.

During the week ended May 10, 1913, a case of leprosy was notified in San Francisco, and during the month of June another case in San Francisco in the person of a Chinaman, 42 years old, who had been in the United States six months. The latter case was reported as being of the tubercular type.

COLORADO.

Dr. Sherman Williams, president of the Colorado State Board of Health, reported July 22, 1912, that they had in detention at Denver a man claiming to be a leper, who had escaped from the leper colony at San Francisco about May 2 and had been wandering over the country since that time in a box car.

FLORIDA.

During the week ended August 3, 1912, 1 case of leprosy was reported at Tampa, Fla.

MASSACHUSETTS.

During the week ended June 15, 1912, 1 case of leprosy was reported at Boston, Mass.

The State board of health reported a case of leprosy which was diagnosed clinically March 8, 1913, in Boston in the person of a Chinaman, age 38 years. The patient had lived in Boston for one year, previous to which he had lived seven years in California. The diagnosis was verified bacteriologically. The case was reported to be of the tubercular type and under the control of the State board of charities.

HAWAII.

During the year 1912, 28 new cases of leprosy were reported in Hawaii, and during the first six months of 1913, 27 new cases were reported.

On July 1, 1913, 726 cases of leprosy were reported present in Hawaii.

INDIANA.

One case of leprosy was reported in Indiana in March, 1912.

MICHIGAN.

The secretary of the State board of health forwarded the following report of 2 cases of leprosy reported in Michigan:

H. H., a Russian Jew, age 47 years, born in Courland, Russia, was clinically diagnosed as being affected with leprosy at Detroit, April 14, 1912. The diagnosis was verified bacteriologically. The patient had lived at Bay City, Mich., during the past 19 years and before that had lived in Cape Colony, South Africa, for about 7 years. Previous to his residence in Cape Colony he had lived in Russia. His father and an uncle are reported to have died of a peculiar skin disease, characterized by the loss of fingers and the mutilation of their noses. The patient is now quarantined in his own home in Bay City.

S. I., a Russian Jew, male, age 34 years, born in Courland, Russia, was found to have leprosy about May 17, 1912. The patient was known to have lived in and around Bay City, Mich., as a tramp junk dealer for about three years. At the time this case was reported to the State department of health the patient had broken quarantine and his whereabouts was unknown. However, about June 20 he returned to Bay City and was placed under quarantine by the city health department. On June 30 he again broke quarantine and on July 22 the commissioner of health of Buffalo reported that he had been found in that city and was being isolated at the contagious disease hospital. He later escaped fror . detention in Buffalo and his present whereabouts is unknown.

MINNESOTA.

One new case of leprosy was reported in Minnesota in November, 1912, and 1 case in January, 1913. Fourteen cases of leprosy were reported present in Minnesota July 1, 1913.

MISSISSIPPI.

The Mississippi State Board of Health reported the occurrence of a case of leprosy in Hancock County during the month of January, 1913.

NEW YORK.

One new case of leprosy was reported in New York in June, 1913.

RHODE ISLAND.

The State Board of Health of Rhode Island reported that a case of leprosy had been notified at Narragansett Pier, R. I., May 1, 1913. The case was in a male, 32 years of age, who had lived in Rhode Island 21 years, previous to which period he had lived in the island of Penang. The first symptoms of the disease had been noticed at about the age of 19 years. The patient had been confined to his home premises during the last 5 years, and when arrangements were being made to isolate the case on a farm he and his mother disappeared and their address was unknown on the date of the report, May 22, 1913.

TEXAS.

The secretary of the State board of health reported that a fatal case of leprosy had been notified at San Antonio during the month of January, 1913, in the person of a white male.

During the month of April, 1913, a case of leprosy was notified at Corpus Christi, Tex., after the case had gone to Beeville, Bee County, Tex.

The Status of Lepers.

Lepers are taken care of in various ways in the different States. Two States, Massachusetts and Louisiana, have established institutions for their segregation and care. Other States attempt to control their movements by confining them to their home premises. Other States ignore them entirely. The cases being reported each year, some of which are in native Americans, bring to general attention the need for some definite policy which will act uniformly throughout the country for the control and segregation of these unfortunates. During the calendar year 1911 there were reported in the continental United States 41 cases of leprosy as coming to official notice during the year. These 41 cases were distributed among 19 States. At the beginning of the calendar year 1912 there was a total of 146 cases known to be present in the country. These cases were under the supervision of the health authorities of 17 different States.

The number of cases in many of the States is so small that it has been considered economically impracticable to make satisfactory provision for their control and care. It is believed, however, that the sanitary welfare of the community and of future generations makes it imperative that adequate provision be made for all cases. Leprosy is a disease which appears to require for its spread from the sick to the well a more or less prolonged or intimate contact. It is, however, an infectious disease due to a specific microorganism, and each case represents a focus of infection from which other persons may become infected if their association with the sick is sufficiently intimate or prolonged. There are comparatively few cases of leprosy now in the United States, but if this number is to be kept small and the burden of an ever increasing number of lepers is not to be placed upon future generations, it is necessary that all foci of the infection be controlled and lepers segregated. This segregation will necessarily work some hardship on the persons affected, but probably not so great a hardship as that put upon these unfortunates at the present time in the average American community. As the segregation of lepers will be for the welfare of the community at large, it should be made as agreeable and as devoid of inconvenience to the sick as it is practicable to make it.

Pellagra.

Pellagra was first recognized in the United States in 1907. It appears to be conclusive that many cases occurred before that time unrecognized. Since 1907 much attention has been given to the disease and American physicians have become more and more familiar with its symptoms and manifestations. With an increased familiarity with pellagra greater numbers of cases have been found, and it has become very important that the relative prevalence and geographic distribution of the disease in this country be ascertained.

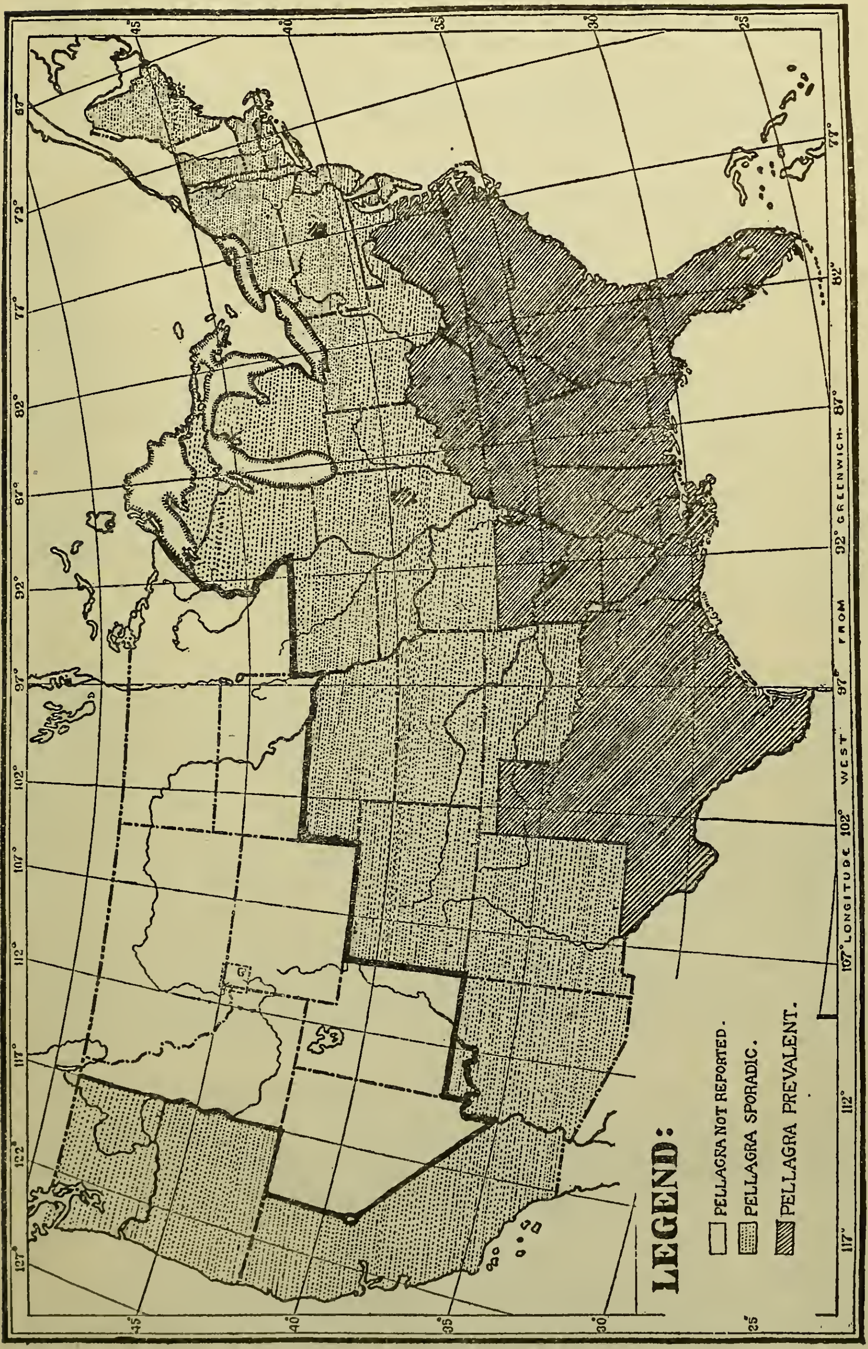
Cases of pellagra are required to be notified in but four States, California, New York, Pennsylvania, and Washington, so that only in these States are the recognized cases made a matter of record. These States are outside of the territory in which the disease prevails and in them only sporadic cases seem to occur. Throughout all the territory in which the disease is most common there are no requirements for the notification to the health authorities of cases of pellagra excepting in the State of Mississippi. The result is that the health authorities in the affected territory have no accurate knowledge of the number of cases occurring within their respective States, nor of the respective localities in which the disease is most prevalent. It is highly important that the relative prevalence and geographic distribution of the disease be ascertained, and to this end the Public Health Service has collected data as best it could by correspondence with physicians and officials, and in certain instances by investigating conditions in localities in which the disease had been reported to be especially prevalent. The ascertaining of the localities in which the disease is most prevalent and the conditions under which cases occur will undoubtedly help to solve the mystery of the cause of this malady.

The prevalence of the disease, as shown up to the present time by the pellagra survey being carried on, is indicated by the following table and map, the latter of which shows by dark shading the sections of the country in which pellagra is most prevalent, by light shading the States in which occasional cases have been reported, and by the unshaded areas the States in which the disease apparently has not occurred:

Pellagra—Prevalence as shown by reported cases.

States.	Race and sex of reported cases.					Total cases.	Deaths.	Death rate per 100 reported cases.
	White.		Colored.		Race and sex not reported.			
	Male.	Female.	Male.	Female.				
1907 to 1911, inclusive.								
Virginia	174	302	49	103	....	628	349	55.59
North Carolina	543	1,201	130	277	261	2,412	1,067	44.37
South Carolina	357	772	120	351	280	1,880	582	30.95
Georgia	985	2,142	166	575	690	4,558	1,582	34.70
Kentucky	159	283	15	24	32	513	220	42.88
Alabama	150	988	133	680	363	2,314	859	37.12
Mississippi	433	954	249	907	352	2,895	1,250	43.17
Louisiana	123	215	69	200	63	670	296	44.17
Total	2,924	6,857	931	3,117	2,041	15,870	6,205	[1]39.1
1907 to 1912, inclusive.								
Arkansas	227	340	81	274	23	945	396	41.90
Oklahoma	150	254	12	39	17	472	259	54.91
Texas	567	1,508	90	300	163	2,628	1,225	46.61
Total	944	2,102	183	613	203	4,045	1,880	46.72
Grand total	3,868	8,959	1,114	3,730	2,244	19,915	8,085	[1]40.59

[1] Aggregate fatality rate per 100 reported cases.


LEGEND:
PELLAGRA NOT REPORTED.
PELLAGRA SPORADIC.
PELLAGRA PREVALENT.
LONGITUDE WEST FROM GREENWICH
127°
122°
117°
112°
107°
102°
97°
92°
87°
82°
77°
72°
67°
45°
40°
35°
30°
25°

Of the States included in the territory in which pellagra is prevalent, Mississippi has been making an especial effort during the last few months to ascertain the prevalence of the disease, and the occurrence of cases has, so far as known, been made a matter of record. The prevalence of the disease during the first six months of 1913, as indicated by the notification of cases, is shown by the following table:

Cases of pellagra reported in Mississippi during first 6 months of 1913.

	Total.		January.		February.		March.		April.		May.		June.	
	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.
State	648	665	28	32	44	24	53	31	146	54	124	137	253	387
COUNTIES														
Adams		2	(1)	(1)	(1)	(1)		2	(1)	(1)	(1)	(1)	(1)	(1)
Alcorn	11		(1)	(1)	1		1		3		3		3	
Amite	9		(1)	(1)			(1)	(1)	(1)	(1)	(1)	(1)	9	
Attala	6		1		2		1		2		(1)	(1)	(1)	(1)
Benton	8	4					1		2		3	1	2	3
Bolivar	1	96	(1)	(1)	(1)	(1)	(1)	(1)			1	24		72
Calhoun			(1)	(1)			(1)	(1)	(1)	(1)			(1)	(1)
Carroll	1	1	1							1			(1)	(1)
Chickasaw	10	8	(1)	(1)	4	1	1		1	3	4	4	(1)	(1)
Choctaw	2												2	
Claiborne													(1)	(1)
Clarke	5	5	2	2		2	1	1	2		(1)	(1)	(1)	(1)
Clay	11	47		3			1	2	2	4	4	18	4	20
Coahoma		2		1		1								
Copiah	114	25	5	4	5	2	3	1	20	2	11	8	70	8
Covington	2				(1)	(1)					(1)	(1)	2	
De Soto	2	16										13	2	3
Forrest	3	2	(1)	(1)					(1)	(1)	(1)	(1)	3	2
Franklin	3										1		2	
George	13	1	1				1		2		1		8	1
Greene	6	1	2		2		1				1			1
Grenada	3	5							2	1	1	4		
Hancock													(1)	(1)
Harrison	11	5	1	1	1			1			7	3	2	
Hinds	5	13										3	5	10
Holmes	13	43	1	1		2	2	4	2	10	2	7	6	19
Issaquena		6						1	(1)	(1)				5
Itawamba	45		5		9		5		16		6		4	
Jackson		1												1
Jasper	9	1		1	1		1		1		1		5	
Jefferson											(1)	(1)	(1)	(1)
Jefferson Davis	2	7		2		1		3			1		1	1
Jones	51	18	(1)	(1)	3		11	5	20	3	4	3	13	7
Kemper			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Lafayette	2	2										1	2	1
Lamar	11	1					2	1			3		6	
Lauderdale	33	24	3		3		2	1	4	3	12	7	9	13
Lawrence	4		2						2					
Leake	3	5	(1)	(1)						1	2	2	1	2
Lee	54	19	(1)	(1)	3		4		14	5	11	2	22	12
Leflore	5	8	1	4	1	2	2		1	2	(1)	(1)	(1)	(1)
Lincoln	18	18	(1)	(1)				2	7	1	(1)	(1)	11	15
Lowndes			(1)	(1)	(1)	(1)					(1)	(1)	(1)	(1)
Madison	2	2									2	2	(1)	(1)
Marion	12	1	(1)	(1)					5		7	1	(1)	(1)
Marshall	2	4					1					2	1	2
Monroe			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Montgomery	16	18		1	1		1	1	6	2	4	6	4	8
Neshoba	3				1				1		1			
Newton														
Noxubee	8	6			1	2	2	2	(1)	(1)	(1)	(1)	5	2
Oktibbeha	1	2			(1)	(1)					1	2		
Panola	4	14					1			3	2	8	1	3
Pearl River	2	1											2	1
Perry	21	3						1	9	1	12	1	(1)	(1)
Pike	25	24					(1)	(1)	(1)	(1)	(1)	(1)	25	24

[1] County health officer failed to make a report.

Cases of pellagra reported in Mississippi during first 6 months of 1913—Continued.

	Total.		January.		February.		March.		April.		May.		June.	
	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.
COUNTIES—continued.														
Pontotoc	12	6	....	....	4	2	4	2	4	2	....	....	(1)	(1)
Prentiss	4	....	(1)	(1)	....	....	1	....	2	....	1	....	(1)	(1)
Quitman	1	6	....	1	....	1	....	1	....	....	....	1	1	2
Rankin	11	2	(1)	(1)	1	....	1	....	6	....	3	2	(1)	(1)
Scott	16	11	2	1	....	....	....	....	1	3	3	5	10	2
Sharkey	....	....	....	....	....	....	....	....	(1)	(1)	....	....	....	....
Simpson	....	2	....	2	....	....	....	....	....	....	(1)	(1)	(1)	(1)
Smith	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sunflower	....	....	(1)	(1)	(1)	(1)	....	....	(1)	(1)	(1)	(1)	(1)	(1)
Tallahatchie	10	11	(1)	(1)	(1)	(1)	(1)	(1)	6	5	4	6	(1)	(1)
Tate	3	2	....	....	....	....	....	....	1	....	1	1	1	1
Tippah	....	....	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Tishomingo	....	....	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Tunica	3	50	....	5	....	6	....	....	....	2	(1)	(1)	3	37
Union	2	....	(1)	(1)	....	....	....	....	....	....	2	....	....	....
Warren	....	....	....	....	....	....	....	....	....	....	....	....	(1)	(1)
Washington	5	111	....	3	....	1	....	....	(1)	(1)	....	....	5	107
Wayne	2	....	....	....	....	....	....	....	....	....	1	....	1	....
Webster	2	....	....	....	....	....	....	....	1	....	1	....	(1)	(1)
Wilkinson	2	....	....	....	(1)	(1)	2	....	....	....	....	....	....	....
Winston	....	....	....	....	....	....	....	....	....	....	(1)	(1)	(1)	(1)
Yalobusha	2	1	1	....	1	1	....	....	....	....	....	....	....	....
Yazoo	1	2	....	....	....	....	....	....	1	....	....	....	....	2

[1] County health officer failed to make a report.

RABIES.

Until recently rabies was limited to the territory east of the Rocky Mountains. It is only within the last few years that the disease has appeared on the Pacific coast. West of the Rockies cases were first found in California and later in Oregon and Washington. On April 23, 1913, cases of rabies were found in the city of Tacoma, Wash., and near-by portions of Pierce County. So far as the records show this is the first occurrence of rabies in the State of Washington west of the Cascade Mountains. The disease is supposed to have been imported into Tacoma in a dog brought from Arizona during the autumn of 1912. During March and April a considerable number of rabid dogs were killed in the city of Tacoma. On September 18, 1913, rabies was reported in a dog in Seattle, Wash. This is believed to be the first reported case of rabies in that city.

POLIOMYELITIS (INFANTILE PARALYSIS).

During the year ended June 30, 1913, there have been but few outbreaks of poliomyelitis of any size. The two most important outbreaks were those at Los Angeles, Cal., and Buffalo, N. Y.

LOS ANGELES, CAL.

In Los Angeles single cases of poliomyelitis were reported—1 in October and 1 in November, 1911, and 1 in March, 1912. In June, 1912, 19 cases with 4 deaths were reported and during the next two months the number was greater. From June 1 to September 7 there were reported 249 cases. During the height of the outbreak from 20 to 40 cases were reported weekly. During the week ended September 7 only 5 cases in all were reported. The subsidence of the outbreak followed closely upon the establishment of a rigid quarantine of premises where cases existed, the closing of all schools, and the suppression of gatherings of large numbers of children.

Soon after the appearance of the disease in Los Angeles, in June, cases were noted at the beach resorts in the vicinity and later in neighboring counties and occasionally in those at a distance. Among the counties thus invaded were Riverside, Ventura, Merced, Sacramento, San Joaquin, and San Francisco.

BUFFALO, N. Y.

An outbreak of poliomyelitis occurred in Buffalo at about the same time as the one in Los Angeles. It had its beginning in June and reached its maximum during July and August. From June 1 to October 12, 326 cases were reported, of which 35 had terminated fatally. The outbreak terminated during the latter part of October. Cases of the disease also occurred in the surrounding counties in western New York and especially in Cattaraugus, Chautauqua, Erie, Genesee, Livingston, Niagara, Orleans, Wyoming, and Allegany Counties, in which 104 cases, with 16 deaths, were reported.

NEW YORK CITY.

From June 1 to September 28, 1912, there were notified in New York City 184 cases of poliomyelitis, with 26 deaths. The largest number of cases reported for any one week was 34 for the week ended September 14.

TEXARKANA AND VICINITY.

Poliomyelitis broke out in Texarkana in May, 1913. A case, however, had occurred as early as April 5. In all there were 143 cases, of which 50 occurred in Texarkana, or within a radius of 2 miles. The remaining cases occurred in neighboring towns and counties. The distribution of cases is shown by the following table:

Distribution of cases.

	Population.	Number of cases.
Texarkana, Tex., Ark.	17,000	50
De Queen, Ark.	2,018	10
Lockesburg, Ark.	748	20
Wilton, Ark.	294	7
Ashdown, Ark.	1,247	9
Annona, Tex.	429	8
De Kalb, Tex.	650	10
New Boston, Tex.	950	12
Hooks, Tex.	98	3
Nash, Tex.	210	10
Queen City, Tex.	388	4
Total		143

Of the 143 cases, 124 had their onset between May 20 and June 18.

EPIDEMIC CEREBROSPINAL MENINGITIS.

During the year ended June 30, 1913, epidemic cerebrospinal meningitis has been present to some degree throughout the United States, cases having occurred in all parts of the country. For the most part the cases reported have been few in number and largely sporadic in character. Few outbreaks worthy of notice have occurred. The largest of these were reported from Arkansas, Tennessee, and the southern part of Illinois during January, 1913. Of this outbreak there is only a fragmentary record of the number of cases that occurred, as the notification of cases was exceedingly incomplete. In January, when the outbreak first began to attract unusual attention, in Arkansas there had been 25 cases, with 17 deaths, reported at Lepanto, Poinsett County. January 6 there had also been sporadic cases reported in other parts of the State.

In Tennessee, to January 13, there had been 108 cases, with 47 deaths, reported in Dyer County; 13 cases, with 9 deaths, in Lake County; and cases in Carroll County and in other parts of the State.

In southern Illinois, to January 10, there had been 11 cases, with 7 deaths, in Hamilton County; cases had also occurred at Cairo. The outbreak extended to the State of Kentucky.

It will be remembered that the year before there was an outbreak farther south which attracted considerable attention, and had its center and principal foci in Texas, from which it spread into Oklahoma and neighboring States. This year the center of the epidemic appeared to be in Arkansas, Tennessee, Kentucky, and southern Illinois.

The disease was also present in Texas this year. During the last week of December, 1912, 10 cases of epidemic cerebrospinal meningitis were reported in Eagle Pass. Of these 10 cases, 1 was mild and 9 were reported to be of the "fulminating" type, and the patients died in from 6 to 36 hours.

In Arizona 58 cases were notified from January 1 to May 8, 1913. In Los Angeles, Cal., there were 82 cases reported between January 1 and July 26, 1913.

A small outbreak occurred in Midville, Ga., during December, 1912.

Surg. Carrington reported that during the year 1912 there had been 486 deaths in Missouri registered as due to cerebrospinal meningitis. This would indicate that the disease had been quite prevalent. How prevalent can not be known, as cases were not required to be notified in that State.

TRACHOMA.

Trachoma has been found to be widely prevalent in the mountain region of Kentucky. Out of approximately 4,000 people examined in this locality, 500, or 12½ per cent, were found to have the disease. The examination of school children in the various mountain counties showed that from 3 per cent in some counties to 18 per cent in others were affected. It is evident that the disease has been present among these native-born Americans for many years. With trachoma so prevalent in the mountain districts of Kentucky it is quite likely that similar conditions will be found to exist in the contiguous mountain regions of Tennessee, West Virginia, and Virginia, and possibly of North Carolina.

Trachoma has also been found to be a very common disease among the Indians in this country, and especially among those living on reservations. The disease appears to be much more prevalent in the United States than had been previously believed to be the case.

Trachoma is known to be communicable and is believed to be contagious. It is a serious malady, reducing very markedly the efficiency of those affected and, if untreated, causes impaired vision in a large proportion of cases and blindness in not a few.

Wherever present to any great extent the disease is a public-health problem of no small importance, and its eradication, which is necessary for the welfare of the community, will require patient and systematic work on the part of the health authorities and the cooperation of the people.

Trachoma is common in parts of Asia and southern Europe. Immigrants suffering with this disease are not allowed to enter the United States. Recent reports indicate that trachoma is also present in Chile, where it appears to be spreading. Many cases have been noted in Valparaiso. The disease is most prevalent in localities where the hygienic conditions are bad and in those sections of cities where there is marked congestion and overcrowding. The disease has undoubtedly been imported into Chile by immigrants coming from localities where it is endemic.

Typhus Fever.

IDAHO.

The State Board of Health of Idaho reported that a case of typhus fever had occurred at Boise, Idaho, about March 14, 1913, in the person of a Spanish sheep herder who had recently come from South America via England.

MASSACHUSETTS.

The State Board of Health of Massachusetts reported that a case of typhus fever had occurred at 20 Parkman Street, Boston, Mass., about February 8, 1913; that the patient had been taken sick two days after arrival from Halifax and had been removed to the Massachusetts General Hospital, from which he was discharged March 9, 1913, when he returned to his home in Halifax.

NEW YORK AND OKLAHOMA.

One death from typhus fever was reported in New York in August, 1912, and in Oklahoma 4 deaths from this disease were reported, 3 in November and 1 in December, 1912. One death was reported in Oklahoma in January, 1913.

While the only cases of typhus fever coming to the attention of State boards of health were apparently in Idaho, Massachusetts, New York, and Oklahoma, it is not, however, to be inferred that these were the only States in which cases of the disease occurred, but probably that the boards of health of these States were alive to the importance of the disease and on the lookout for cases. It is very probable that cases of typhus fever have occurred in various parts of the country and that undoubtedly there have been cases in all the larger cities. That for a number of years cases have occurred annually in New York City in considerable numbers is true, as the so-called "Brill's disease" has been ascertained to be identical with typhus fever.

MEASLES.

There was a measles outbreak of considerable size in Pittsburgh, where between November, 1912, and July 26, 1913, a total of 9,583 cases with 165 deaths had been reported.

In Los Angeles, Cal., 6,444 cases of measles were notified to the health authorities between January 1 and July 19, 1913.

In St. Louis, Mo., there were 4,281 cases of measles with 37 deaths reported between April 1, 1912, and March 1, 1913.

During the year there was a considerable outbreak of measles in Richmond, Va., where between January 21 and April 26, 1913, there were 3,821 cases with 22 deaths notified to the health authorities. Other outbreaks have occurred in cities in various parts of the country. In some cases little or no attention was paid to the disease by the health authorities and little if any attempt made to ascertain the extent of existing epidemics.

It will be noted that in Pittsburgh there were 61 cases reported for each death registered; in St. Louis, 115; and in Richmond, 173. Either the disease was milder in Richmond or the cases were much more completely reported than in St. Louis or Pittsburgh.

BERIBERI.

The occurrence of beriberi in this country is sufficiently infrequent to make outbreaks worthy of note. During the year there was an outbreak of beriberi in the State asylum at Austin, Tex. There were quite a number of cases, just how many is not known, as the details of the outbreak were not obtainable.

SEVEN-DAYS FEVER.

The occurrence in the Canal Zone during the summer of 1912 of a number of cases of what appears to have been the seven-days fever, previously reported only in India and the ports of southeastern Asia, adds one more disease to the list of those that the American physician should bear in mind in the consideration of continued fevers.

This disease was differentiated from other fevers by Rogers in 1905–1908 as a sporadic fever occurring in the seaports of India. In India and Ceylon this fever has since been found in the cities and towns in low-lying regions, usually near the sea. In Calcutta and Colombo it occurs during the summer months, May to September. These are the months during which the disease was noted in the Canal Zone. Physicians in the southern ports of the United States should be on the lookout during the summer months for cases of this fever. The cause of the disease has not been found, and no fatal cases have been noted. Where present, however, it is a malady to be thought of in the differential diagnosis of malaria, typhoid fever, dengue, and other fevers.

MALARIA.

Malarial fever has been ascertained to be much more prevalent in the United States than has usually been believed. This excessive prevalence exists not only in the States south of the Ohio River, but also in certain localities farther north. South of the Ohio River malaria has been found to be present in practically all localities in which there are present suitable breeding places for the anopheline mosquitoes. The three types of the disease, the tertian, the quartan, and the estivo-autumnal are present. In many localities pernicious malaria is recognized as a not uncommon ailment by the practicing physicians. How prevalent the disease is has not been possible as yet to determine, due to the fact that cases are not required to be reported to the health authorities except in 4 States—Arizona, New Jersey, Pennsylvania, and Washington—and also to the fact that in many places there is much confusion in the diagnosis. Malaria is known to be present in central California and to some extent in Oregon and Washington. The disease has been found to be prevalent in certain localities in Connecticut. It undoubtedly prevails, unknown to the health authorities, also in many other localities in the Northern States. A map of the United States showing the prevalence and geographic distribution of this disease is greatly needed, and the data necessary for the making of such a map is now being collated. However, our information of the relative prevalence of the disease and its geographic distribution will continue to be incomplete and unsatisfactory until the disease has been made notifiable in all States.

DENGUE.

There was also an outbreak of dengue in Florida during October, 1912. The disease was present, especially in Tampa, Gainesville, Miami, and Key West.

In October, 1913, the disease appeared in Savannah, Ga. The extent of this outbreak is not known, as the notification of cases was not required.

MARINE HOSPITALS AND RELIEF.

RELIEF STATIONS.

During the year the service operated 23 marine hospitals, all of which are owned by the Government, and maintained 125 other relief stations where hospital and dispensary relief was furnished. Owing to the small amount of relief furnished, the relief station at Morgan City, La., was closed during the year. On account of a rearrangement of the customs districts, several customs offices where relief to sick seamen had formerly been furnished, were discontinued on July 1, 1913. The stations closed were Burlington, Iowa; Edenton, N. C.; Edgartown, Mass.; Sag Harbor, N. Y.; and Wheeling, W. Va.

RELIEF TO SEAMEN.

During the year 50,604 seamen were treated in the various marine hospitals and relief stations of the service. Of this number 14,097 were treated in hospitals a total of 405,944 days, and 36,507 were treated at the dispensaries a total of 60,699 times. During the year 430 seamen engaged on foreign vessels received hospital treatment a total of 5,612 days.

The medical officers of the service made 9,971 physical examinations during the year. These examinations were made of applicants for original or renewal of license as master, mate, or pilot; applicants desiring to enter, or already engaged in the various branches of the Government service; examinations made of American seamen, foreign seamen, and persons contemplating service in the Philippine Islands.

Medical officers of the service detailed for duty on board vessels of the United States Revenue-Cutter Service cruising in northern waters, furnished all possible medical relief to natives inhabiting both the mainland and the neighboring islands of Alaska.

AID TO DIFFERENT BRANCHES OF THE GOVERNMENT SERVICE.

Revenue-Cutter Service.—Twelve hundred and eighty-six men were examined physically, of whom 200 were rejected.

Steamboat-Inspection Service.—Five thousand nine hundred and four pilots were examined as to visual capacity, of which number 88 were rejected.

Life-Saving Service.—One thousand three hundred and seventy-nine keepers and surfmen were physically examined, of which number 39 were rejected.

Four hundred and fifty disability certificates referred to this bureau by the general superintendent of the Life-Saving Service were passed upon. These called for an expression of opinion on the medical evidence of disability submitted in claims for benefits under the act of Congress approved March 4, 1882; upon the physical fitness of keepers and surfmen for enlistment, promotion, and retention, and upon evidences of death submitted by widows or orphans in their claims for benefits.

The services of 21 acting assistant surgeons were continued during the year for the physical examinations of keepers and surfmen at points not easily accessible to regular officers at stations of the service. In addition, 5 medical officers were detailed at the request of the general superintendent, to various points along the Atlantic coast to examine candidates for reenlistment.

Coast and Geodetic Survey.—One hundred and two employees and applicants for appointment were examined, of which number 7 were rejected.

Lighthouse Service.—Ninety-seven applicants for enlistment were examined, of which number 4 were rejected.

Immigration Service.—Two hundred and forty-five persons connected with the Immigration Service were physically examined; of this number 10 were rejected.

Civil Service Commission.—One hundred and fifty-five applicants for appointment were physically examined; of this number 5 were rejected.

Isthmian Canal Commission.—Six employees and applicants for appointment were physically examined; of this number 1 was rejected.

PHYSICAL EXAMINATIONS OF MERCHANT SEAMEN.

Physical examinations were made of 744 American seamen, of whom 20 were rejected, and 15 foreign seamen, of whom 7 were rejected.

PHYSICAL EXAMINATIONS, PHILIPPINE ISLANDS.

Physical examinations were made of 38 applicants in the United States to serve in the islands, of which number none were rejected.

PURVEYING DEPOT.

The following statistics show the transactions of the purveying depot during the fiscal year:

SUPPLIES PURCHASED.

Drugs and chemicals	$19, 788. 65
Beds, bedding, etc	13, 464. 15
Surgical instruments and appliances	10, 482. 93
Pharmacal implements, miscellaneous, etc	6, 943. 05
Alcohol, wines, etc	2, 557. 98
Books and journals	1, 318. 02
Bacteriological supplies, etc	1, 075. 45
Flags	781. 78
Packing boxes and sawdust	379. 44
Total	56, 791. 45

CREDIT.

By bills paid direct from funds:		
Quarantine service	$5,453.17	
Maintenance	420.96	
Care of seamen	387.03	
Bureau	316.64	
Epidemic fund	91.92	
		$6,669.72
Total		50,121.73
By amounts reimbursed from other appropriations for supplies issued from stock:		
Quarantine service	$5,178.71	
Epidemic fund	65.40	
Treasury Department	55.29	
		5,299.40
Net expenditures chargeable to appropriations for purveying depot (in amount $45,000)		44,822.33
Salaries	6,040.00	
Operating expenses	183.91	
		6,223.91
Total net expenditures		51,046.24

Number of requisitions filled	283
Number of packages shipped	2,243
Total weight of supplies shipped (pounds)	232,455

TUBERCULOSIS SANATORIUM AT FORT STANTON, N. MEX.

Passed Asst. Surg. F. C. Smith, in charge, reports as follows regarding the transactions of the sanatorium for the fiscal year ended June 30, 1913:

General information.

Patients present July 1, 1912	176
Patients admitted during the year	138
Total treated during the year	314
Patients discharged during the year	168
Deaths (included in preceding item)	47
Bodies interred in sanitarium cemetery	46
Patients present June 30, 1913	146
Maximum number of patients during year	212
Minimum number of patients during year	146
Total days' treatment furnished patients	65,999
Officers and attendants	75
Patients who left against advice	19
Patients discharged for causes affecting discipline	4
Patients transferred to other stations (dyspnea)	1
Physical examinations made during the year	1,112
Sputum examinations made during the year	1,243

Ages of patients treated during the year:	
Under 25 years	38
Between 25 and 34 years	111
Between 35 and 44 years	88
Between 45 and 54 years	46
Over 54 years	22
Nontuberculous (lungs)	3
Admitted, discharged, and readmitted	2
Discharged and readmitted	4
	314

Tubercle bacilli in sputum of 134 new tuberculous cases—

Were found in	107
Were not found in	24
No examination	3
	134

Prognosis on arrival:

Favorable	33
Favorable for arrest	56
Favorable for prolongation of life by living under proper conditions	17
Unfavorable	25
No examination	3
	134

Record of pulmonary hemorrhage of patients admitted:

Before arrival only	36
After arrival only	5
Neither before nor after arrival	88
Both before and after arrival	2
No examination	3
	134

Patients discharged during the year with stage of disease and results of treatment.

	Appeared cured.	Arrested.	Improved.	Unimproved.	Died.	Total.
Incipient	10	7	3	1		21
Moderately advanced	1	16	4	5	5	31
Far advanced	3	32	16	20	39	110
Nontuberculous (lungs)	1	1		1		3
No examination					3	3

Duration of stay and character of cases discharged during the year.

Character of cases.	Longest stay.			Shortest stay.			Average stay.			Total.
	Yrs.	*mos.*	*dys.*	*Yrs.*	*mos.*	*dys.*	*Yrs.*	*mos.*	*dys.*	
Appeared cured	1	7	5	0	2	20	0	8	16	14
Arrested	4	3	7	0	2	12	1	1	16	55
Improved	2	0	2	0	0	25	0	7	7	23
Unimproved	5	7	29	0	0	14	1	0	1	
Died	4	11	6	0	0	4	1	1	16	47
Nontuberculous (lungs)										3
Total										142

Summary of duration of stay.

Over 2 years	21
Between 1 and 2 years	33
Between 6 and 12 months	56
Between 3 and 6 months	32
Between 1 and 3 months	15
Under 1 month	8
Nontuberculous (lungs)	3
Total	168

"Period of prevention" of the 47 who died, included in above summary.

Over 2 years	10
Between 1 and 2 years	7
Between 6 and 12 months	12
Between 3 and 6 months	6
Between 1 and 3 months	6
Under 1 month	6
Total	47

Tuberculous officers and employees were also treated, as follows:

Under treatment July 1, 1912	13
Admitted during the year	14
Total	27
Remaining under treatment June 30, 1913	16
Discharged during the year	11
	27

Of those discharged, 2 were apparently cured, 6 arrested, 1 unimproved, and 2 died.

Ultimate Results.

Tracing of discharged patients has been continued throughout the year. The results are not gratifying either in the number located or in the state of health of the individuals when found. Out of 1,924 patients whose treatment terminated more than six months ago only 149 are known to be living, while 922 are known to be dead, and the condition of 853 could not be determined. The sanitary value of isolating a large number of open cases of tuberculosis can not be overestimated, but it must be admitted that the sanitarium for advanced cases plays no other large part in the general campaign against the disease.

DENTAL REPORT.

From November until May the station enjoyed the services of an excellent dentist. The usual institutional work and some work not usually included in such was rendered free to the patients. The position is at present vacant, which is a matter of regret, as the presence of a dentist is constantly necessary. Routine examinations of the teeth were made by the dentist every two months and such prophylactic measures as were necessary instituted. This procedure is extremely valuable and should, I believe, constitute a part of the routine treatment of tuberculous cases.

The expert farmer and two female nurses have been continued on the station force during the year with success. The position of dietitian has been vacant, owing to the difficulty in obtaining one properly qualified. A competent dietitian could, with advantage, take entire charge of subsistence at this station under the immediate direction of the medical officer in charge.

FARM.

The coldest winter in the history of the station followed by a very dry summer has resulted in considerable losses to the herd. Two hundred and nine were slaughtered, furnishing beef for 11 months of the year, and 2,266 cattle are on hand. Hides were sold at auction for $1,390.81, and unserviceable horses for $300. Milk, in amount 41,838 gallons, was produced and sufficed for all needs. The dairy herd was given the customary tuberculin test with the usual negative results. Table milk is served in individual pint bottles to patients. The increased cold-storage capacity allows beef to be hung six weeks after being slaughtered with resultant improvement in quality. Station beef is corn fattened during the winter and spring months.

Products of dairy, farm, and garden.

Beef	pounds	112, 708
Pork	do	4, 622
Eggs	dozens	791
Milk	gallons	41, 838
Alfalfa [1]	tons	131
Corn ensilage [1]	do	180
Green corn	pounds	3, 007
Lettuce	do	1, 000
Onions	do	518
Other vegetables	do	618
Hides sold		$1, 390. 81
Excess Jersey calves sold		$91. 50

[1] Consumed in producing milk.

WATER SUPPLY.

Two new pumps have been installed in the two deep wells and permanent arrangements completed to dispense with the gravity system now rendered inadequate by the diversion of water from the South Fork of the Rio Bonito by the El Paso & Southwestern Railroad Co. This company has not diverted water from the main stream of the Bonito during the present summer, however, and, in spite of excessive dryness, there has been no difficulty in pumping water from the gravels which supply the shallow well. This is in marked contrast to our experience last summer, when, in spite of copious precipitation, the gravels were frequently dry due to diversion of water from the main stream at a point about 15 miles above.

RELIGIOUS SERVICES, ETC.

The chaplain has conducted religious services weekly, visited the sick daily, and has conducted all burial services at the sanatorium cemetery.

The library contains 3,014 bound volumes, and regularly receives, without expense to the Government, 3 daily papers and 69 other periodicals. A total of 10,320 books and magazines were drawn during the year.

A 4-film moving-picture show was given each week during the year free to patients and without expense to the Government.

The custom of giving employment to convalescent cases and allowing private enterprise to suitable cases under treatment has been continued and amplified. The amount earned last year by patients on the pay roll was $10,559.50; by ex-patients retained as attendants, $3,340.33, and by those following private industries, $3,335. Unpaid work, rendered as exercise, in 1-hour periods, under medical supervision, amounted to 3,194 man-hours. Walking stipulated distances is accepted as exercise, but patients declining work on exercise squads are not eligible for positions with remuneration.

COST OF MAINTENANCE.

A total of $127,762.86 was expended by the Public Health Service at this sanatorium last year, of which $23,111.41 was for repairs, renewals of equipment, and new construction. Fuel cost $14,277.61. The purchased ration cost $0.4138 per day, and including beef and milk at cost of production, the ration cost $0.6068 per day. The net expense per patient per day was $1.8968. This is not higher than the cost of maintenance in similar institutions in this neighborhood.

PERSONNEL.

Commissioned Medical Officers.

At the commencement of the fiscal year, July 1, 1912, the commissioned corps consisted of the Surgeon General, 39 surgeons, 74 passed assistant surgeons, and 24 assistant surgeons.

The act of Congress approved August 14, 1912, authorized a new grade to consist of 10 senior surgeons.

The sundry civil act, approved August 24, 1913, authorized 6 additional assistant surgeons, who have had a special training in the diagnosis of insanity and mental defects, for duty in connection with the examination of arriving aliens.

The changes during the fiscal year were as follows: Ten surgeons were promoted to the grade of senior surgeon, 36 passed assistant surgeons to the grade of surgeon, 3 assistant surgeons to the grade of passed assistant surgeon, and 13 candidates who passed the examination required by the laws and regulations of the service were commissioned assistant surgeons. On account of physical disability 2 surgeons and 1 passed assistant surgeon continued on waiting orders. Senior Surg. Frank W. Mead died at Vineyard Haven, Mass., January 18, 1913; Surg. Henry D. Geddings at Washington, D. C., February 13, 1913; Passed Asst. Surg. Thomas B. McClintic at Washington, D. C., August 13, 1913; and Passed Asst. Surg. Samuel C. Hotchkiss at Washington, D. C., August 6, 1912. Asst. Surg. R. H. Lyon resigned March 27, 1913; A. C. Reed, May 20, 1913; and N. D. Brecht, May 31, 1913.

At the close of the fiscal year the commissioned Medical Corps consisted of the Surgeon General, 10 senior surgeons, 63 surgeons, 40 passed assistant surgeons, and 30 assistant surgeons. One senior surgeon, 3 surgeons, and 2 passed assistant surgeons were upon detail in the bureau as assistant surgeons general, in accordance with the act approved July 1, 1902.

Assignments.—Among other assignments of commissioned medical officers during the fiscal year were the following: Thirty-one were assigned to exclusive immigration duty, their services being supplemented by employment of acting assistant surgeons; 6 to the quarantine service of the Philippine Islands; 11 to vessels of the Revenue-Cutter Service; 27 to the quarantine stations in the continental United States, Porto Rico, and the Hawaiian Islands; 7 to duty in foreign countries to prevent the introduction of epidemic diseases into the United States.

Special details.—Two commissioned medical officers continued on detail duty with the Isthmian Canal Commission. Passed Asst. Surg. V. G. Heiser, in addition to his duties as chief quarantine officer, has been continued as director of health of the Philippine Islands. Upon the request of the Commissioner of Education, Department of the Interior, Passed Asst. Surg. Emil Krulish has been continued for duty in Alaska for the improvement of the sanitary and social conditions of the natives.

Personnel, Hygienic Laboratory.—At the close of the fiscal year there were on duty in the Hygienic Laboratory, in addition to the director and assistant director, 3 chiefs of divisions, 8 surgeons, 4 passed assistant surgeons, 3 assistant surgeons, 2 pharmacists, 1 artist, 8 technical assistants, and 32 attendants.

Quarantine inspector.—One quarantine inspector served throughout the entire year.

Acting assistant surgeons.—The services of 26 acting assistant surgeons have been discontinued during the fiscal year, 3 have died, and 28 have been appointed, leaving on duty at the end of the fiscal year 226 such officers.

Medical inspectors.—One female inspector served during the entire year for the inspection of women passengers at Honolulu, Hawaii.

Internes.—At the beginning of the fiscal year there were 16 internes on duty at the various marine-hospital stations; 12 were appointed and 13 were separated from the service by reason of resignation, leaving 15 on duty at the close of the fiscal year.

Pharmacists.—At the beginning of the fiscal year there were on duty 46 pharmacists, divided as follows: Pharmacists of the first class, 16; second class, 21; third class, 9. Four pharmacists of the third class resigned; 4 pharmacists of the third class were appointed, and 3 pharmacists of the third class were promoted, leaving at the close of the fiscal year 46 pharmacists on duty as follows: Pharmacists of the first class, 16; second class, 24; third class, 6.

Pilots and marine engineers.—At the beginning of the fiscal year there were on duty 16 pilots and 21 engineers; 2 pilots resigned and 1 was appointed; 1 marine engineer resigned and 1 was appointed. The number on duty at the close of the fiscal year were as follows: Pilots, 15; marine engineers, 21.

Hospital and quarantine attendants.—At the beginning of the fiscal year 968 attendants were employed at the various marine hospitals, quarantine stations, and on epidemic duty, including 72 such employees on duty in the Philippine Islands, and at the close of the fiscal year there were so employed as follows:

Marine-Hospital Service	545
Quarantine (including Porto Rico and Hawaii)	244
Epidemic	169
	958
Philippine Islands	70
Total	1,028

RECAPITULATION.

Commissioned medical officers	144
Chiefs of divisions, Hygienic Laboratory	3
Artist	1
Technical assistants	8
Quarantine inspector	1
Acting assistant surgeons	226
Medical inspector	1
Internes	15
Pharmacists	46

Pilots	15
Marine engineers	21
Expert farmer	1
Trained nurses	2
Attendants	1,028
Total	1,512

BOARDS CONVENED.

Twenty-six boards were convened at different times and at various stations through the United States for the physical examination of officers of the Revenue-Cutter Service and applicants for entrance therein; 14 for the physical examination of detained aliens; 18 for the examination of commissioned officers to determine their fitness for promotion to the next higher grades of the service; 28 for examination of applicants for appointment as assistant surgeons; and 2 for the examination of pharmacists to determine their fitness for promotion to a higher grade.

Boards were convened for the revision of the regulations for the government of the service and of the regulations governing the uniforms to be worn by officers and employees.

A commission composed of officers of the service and a number of gentlemen of high scientific attainments was formed for the determination of a standard of purity for drinking water for use on common carriers in interstate traffic.

A board of commissioned officers was convened to make an investigation, under the act of July 1, 1902, of a preparation for the cure of tuberculosis.

The bureau sanitary board has been convened in 22 sessions to pass upon reports of inspections of establishments engaged in the manufacture of vaccines, serums, toxins, etc., prior to recommending a license; and to pass upon advertised remedies and appliances to determine if said advertisements should be excluded from the mails.

SERVICE PUBLICATIONS.

As in previous years the bureau has been unable to meet the requests made on it for its publications, because of limited editions. The service publications may be described under eight heads, namely: (1) Annual Reports; (2) Weekly Public Health Reports; (3) Reprints from the Public Health Reports; (4) Supplements to the Public Health Reports; (5) Bulletins of the Hygienic Laboratory; (6) Bulletins of the Yellow Fever Institute; (7) Public Health Bulletins, and (8) Miscellaneous Publications.

Annual Reports.—The laws authorizing the publication of these reports are as follows:

[Act approved July 1, 1902, sec. 9.]

> It shall be the duty of the Surgeon General to transmit annually to the Secretary of the Treasury, for transmission to Congress, a full and complete report of the transactions of said service, including a detailed statement of receipts and disbursements.

Joint resolution, approved February 24, 1905, section 2, provides:

> That there shall be printed each year 4,000 copies of the annual report of the Surgeon General of the Public Health and Marine-Hospital Service, bound in cloth, to be distributed by the Surgeon General.

Weekly Public Health Reports.—These reports are published under authority of section 4 of the act of Congress approved February 15, 1893, quoted in part as follows:

> The Secretary of the Treasury * * * shall prepare, publish, and transmit * * * weekly abstracts of the consular sanitary reports and other pertinent information received by him * * *.

The weekly Public Health Reports, containing the above information, are published in an edition at present of 8,650 copies. These reports are arranged in three parts, the first relating to the United States and to our insular possessions; the second to foreign countries; and the third part dealing with sanitary legislation. In the first part are published articles or contributions of special importance, which are frequently reprinted as separates, the latter being distributed in larger numbers than the full publication, together with reports of sanitary operations, statistical reports of morbidity and mortality in the States and cities of the United States, special tables giving weekly reports of the greater epidemic diseases, such as smallpox, cerebrospinal meningitis, poliomyelitis, erysipelas, pneumonia, rabies, and tetanus, and special tables giving the weekly record of cases and deaths of the principal contagious or infectious diseases in the cities of the United States having a population of more than 25,000 and some under this number, there being included in this table the populations of said cities according to the last census. In the second part are published articles or contributions and statistical tables similar to the above relating to the cities and territories in foreign countries. The third part dealing with sanitary legislation contains State laws and regulations pertaining to public health, and municipal ordinances, rules, and regulations pertaining to the public health.

Supplements to the Public Health Reports.—These pamphlets contain articles on popular subjects of health, and have recently been added to the service publications. Six of these supplements have been issued during the fiscal year, a list of which follows:

1. Measles. By W. C. Rucker.
2. Indoor Tropics: The Injurious Effect of Overheated Dwellings, Schools, etc. By J. M. Eager.
3. Tuberculosis: Its Predisposing Causes. By F. C. Smith.
4. The Citizen and the Public Health. By A. M. Stimson.
5. Fighting Trim: The Importance of Right Living. By J. M. Eager.
6. Contagious Diseases: Their Prevention and Control in Children's Institutions. By James P. Leake.

There is an ever-increasing demand for literature dealing with public health and matters of sanitary importance, and the general public as well as physicians, are showing a greater interest along these lines.

Five hundred and fifty-five thousand and eighty-seven copies of the various reports and bulletins were distributed during the year. While this shows an increase of about 173,315 copies over last year, there is still a great need of more ample provisions for printing larger editions. It is estimated that not over 50 per cent of the requests could be complied with. Several important bulletins have been printed as public documents in comparatively large editions to meet certain demands in special sections of the country. This measure was necessary because of the limited funds available for printing for this bureau.

Reprints from the Public Health Reports.—Fifty-one special articles were printed in the Public Health Reports and have been reprinted. In order to make available to health authorities of the United States information relative to conditions existing in certain localities in the United States and how they have been dealt with, municipal ordinances appearing in the Public Health Reports were reprinted in separate volumes, designated Reprints Nos. 70 and 121. The following is a list of the reprints that were published during the year:

84. Leprosy in the United States. Transportation of Lepers in Interstate Traffic. Amendment to Interstate Quarantine Regulations.
85. Methods and Standards for the Production and Distribution of "Certified Milk." Adopted by the American Association of Medical Milk Commissions, May 1, 1912.
86. The Rat Guard Used in the Philippines. By Carroll Fox.
87. Rabies in the United States in the Year 1911. By A. M. Stimson.
88. The Eradication and Prevention of Bubonic Plague. By Wm. Colby Rucker.
89. The Technique of the Laboratory Examinations of Rats for Plague. By George W. McCoy. Technique Employed in the Examination of Rodents for Plague. By Donald H. Currie.
90. The Post-Mortem Diagnosis of Plague. By Rupert Blue.
91. Antirat Ordinances of San Francisco, Cal., Oakland, Cal., and Seattle, Wash.
92. Active and Passive Immunization Against Plague. By Wade H. Frost.
93. The Public Health Service Tuberculosis Sanitorium at Fort Stanton. By F. C. Smith.
94. Notes on the Bionomics of Rats and Ground Squirrels. By George W. McCoy.
95. The United States Public Health Service.—An act to change the name of the Public Health and Marine-Hospital Service to the Public Health Service, to increase the pay of officers of said service, and for other purposes.
96. Rocky Mountain Spotted Fever. By W. C. Rucker.

97. Smallpox in the United States. Prevalence and Geographic Distribution During the Calendar Year 1911. By John W. Trask.
98. A Squirrel Destructor. An Efficient and Economical Method of Destroying Ground Squirrels. By John D. Long.
99. Transmission of Poliomyelitis by Means of the Stable Fly (Stomoxys Calcitrans). By John F. Anderson and Wade H. Frost.
100. Whooping Cough—Its Nature and Prevention. A Popular Discussion of a Widespread and Dangerous Disease for which Familiarity has Bred Contempt. By W. C. Rucker.
101. Trachoma in Kentucky. Reports of Investigations into the Prevalence of Trachoma in the Mountains of Eastern Kentucky. By John McMullen.
102. The Bedbug. By W. C. Rucker.
103. Septic Sore Throat. A Milk-Borne Outbreak in Baltimore, Md. Epidemiological Study of the Outbreak. By Wade H. Frost. Bacteriological Study of the Outbreak. By William Royal Stokes.
104. Outbreak of Gastro-Enteritis and Typhoid Fever Due to Drinking Water on Excursion Steamer. A report of an investigation of an outbreak of gastroenteritis and typhoid fever at Clinton, Iowa, and other towns along the Mississippi River among excursionists who had been on a river steamer July 29 and 30. By L. L. Lumsden.
105. Antimalarial Measures for Farmhouses and Plantations. By Henry R. Carter.
106. The Prevalence and Geographic Distribution of Pellagra in the United States. By C. H. Lavinder.
107. How the United States Public Health Service Can Help in the Eradication of Preventable Diseases in Kentucky. By Joseph Goldberger.
108. Malarial Fevers—Prevalence and Geographic Distribution in Alabama. By R. H. von Ezdorf.
109. Public Health Administration. Its Dependence upon Reports of Cases of Sickness. By John W. Trask.
110. Hookworm Disease. Proportion of Males to Females in the American Hookworm (Necator Americanus), Based on 13,080 Worms from 102 Cases. By Ch. Wardell Stiles and W. L. Altman.
111. Typhus Fever and Typhoid Fever. A Report on Papers read at the Southern Medical Association Meeting at Jacksonville, Fla., November 12–14, 1912. By Joseph Goldberger.
112. Federal Public Health Administration. Its Development and Present Status in the United States. By J. W. Kerr.
113. Hookworm Disease. Number of Treatments and Number of full Doses of Thymol Administered in 61 Hospital and 22 Home-Cured Cases of Hookworm Infection. By Ch. Wardell Stiles.
114. Plague. The Relation between Traffic and the Spread of Plague. By W. C. Rucker.
115. Hospital Relief for Rural Districts. The Possibilities Offered by Hospital Trains in Furnishing Much Needed Medical and Surgical Facilities to Those Living at a Distance from Cities and Towns. By Ch. Wardell Stiles.
116. Country Schools and Rural Sanitation. Six Sample Public Schools in one County. Does this County Need Medical Inspection in its Schools? The Country School Teacher. By Ch. Wardell Stiles.
117. A New Method of Grading Milk and Cream. By W. C. Woodward.
118. Snuff and Tobacco. Their Use by School Boys and Girls in County Z. By Ch. Wardell Stiles and S. B. Altman.
119. The Rat. Its Habits and Their Relation to Antiplague Measures. By R. H. Creel.
120. Pellagra. A Report on Its Epidemiology. By R. M. Grimm.
121. Municipal Ordinances, Rules and Regulations Pertaining to Public Health. Adopted from July 1, 1911, to December 31, 1911, by cities of the United States having a population of over 10,000 in 1910. Compiled by John W. Trask.
122. Rat Proofing. Its Practical Application in the Construction or Repair of Dwellings or other Buildings. By Friench Simpson.
123. List of the State and Insular Health Authorities of the United States.
124. Epidemic Cerebrospinal Meningitis. Information Relative to the Prevention of its Spread and the Management of Cases. By R. H. von Ezdorf.
125. The Friedmann Treatment for Tuberculosis. A Report on the Present Status of Its Investigation by a Board of Officers of the Public Health Service.
126. Water and Ice Supplied by Interstate Carriers.

127. Soil Pollution. The Chain Gang as a Possible Disseminator of Intestinal Parasites and Infections. By Ch. Wardell Stiles.
128. Typhoid Fever at Albany, N. Y. An Account of the Recent Outbreak Due to Use of Raw Hudson River Water Following Flooding of Filtration Plant. By Theodore Horton.
129. Paratyphoid Fever. A Report of an Outbreak in a Hospital at Roanoke, Va. By L. L. Lumsden, A. W. Freeman, and W. B. Foster.
130. Outbreak and Suppression of Plague in Porto Rico. An Account of the Course of the Epidemic and the Measures Employed for its Suppression by the United States Public Health Service.
131. Sanitation of Flood-Stricken Towns and Cities. With Special Reference to Conditions Observed in River Towns and Cities of Kentucky. By L. L. Lumsden.
132. Fumigation of Vessels for the Destruction of Rats. By S. B. Grubbs.
133. A Model State Law for Morbidity Reports. Adopted by the Eleventh Annual Conference of State and Territorial Health Authorities with the United States Public Health Service, Minneapolis, Minn., June 16, 1913.
134. Investigation of the Prevalence of Trachoma in the State of Minnesota. By Taliaferro Clark.

PUBLIC HEALTH BULLETINS.

Seven public-health bulletins were printed during the fiscal year. This series of bulletins is published so as to make available to the public results of important studies, and to disseminate practical information that will lead to the improvement of sanitation.

The bulletins which have been issued this year and which are representative of this series are as follows:

No. 54. Organization, Powers, and Duties of Health Authorities. An Analysis of the Laws and Regulations Relating Thereto in Force in the United States. By J. W. Kerr and A. A. Moll, August, 1912.

This publication contains an analysis of the laws and regulations in force relating to organization, powers, and duties of health authorities in the United States. A historical sketch is given of health organization in this country. Detailed analyses are presented of the different forms of organization provided for in the several States. Copies of the laws themselves are contained in the bulletin, and a number of court decisions have also been abstracted and included.

The powers and duties of State health authorities are analyzed under several headings, namely, investigative, executive, advisory, educational, quasi legislative, and quasi judicial. Finally, statements of appropriations made by States for health work are presented to convey information as to the present status of public-health administration under existing laws. Presenting as it does for the first time a comprehensive and detailed comparative statement of the powers and duties of health authorities, this bulletin should be of decided value in securing additional necessary health legislation and should contribute to greater uniformity in health administration.

No. 55. A Word to Ship Captains About Quarantine. An Open Letter to Ship Captains. By L. E. Cofer. July, 1912.

This bulletin contains practical information for the use of ship captains to enable them to take proper measures aboard vessels to prevent sickness and to facilitate quarantine administration. It is assumed that ships' captains have important duties to perform of a public-health character, and simple instructions were given as to the discharge of these duties.

No. 56. Digest of Laws and Regulations Relating to Habit-Forming Drugs. By M. G. Motter and M. I. Wilbert. August, 1912.

This bulletin contains an outline of the earliest legislative enactments by the States designed to prevent the accidental ingestion of poisons. The progress of antinarcotic legislation is then referred to, and analyses are presented showing the present requirements of existing laws on this subject. Finally, abstracts and references to Federal, State, and municipal laws, and regulations relating to the sale and manufacture of poisons and habit-forming drugs, are presented.

No. 57. Common Drinking Cups and Roller Towels. An Analysis of the Laws and Regulations Relating Thereto in Force in the United States. By J. W. Kerr and A. A. Moll. August, 1912.

This publication contains a brief sketch as to the views long held regarding the danger of common drinking cups, and presents accumulated evidence on the subject. Analyses of legal measures in force in 26 States and 1 Territory are also presented.

Like information in respect to the dangers of roller towels is also presented. Copies of the laws are given, as well as abstracts of court decisions bearing on the subject.

No. 58. Open Air Schools for the Cure and Prevention of Tuberculosis Among Children. By B. S. Warren. October, 1912.

This bulletin describes the benefits of open-air schools for the prevention and cure of tuberculosis among children, and refers to the site and character of building best adapted for the purpose. Practical detailed information is also presented regarding equipment, operation, and cost of maintenance of such institutions.

No. 59. Transactions of the Tenth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service, Washington, D. C., June 1, 1912.

This publication is an exact transcript of the proceedings of the conference held in accordance with the act of July 1, 1902. The following subjects were discussed at the conference: Report of committee on morbidity reports; compilation of State health laws; the Hygienic Laboratory phenol coefficient for testing disinfectants; Rocky Mountain spotted or tick fever; cerebrospinal meningitis; typhoid fever; and typhus fever.

No. 60. Rules to be Observed by Tuberculous Patients. By F. C. Smith. January, 1913.

This publication is intended as a pocket edition of rules for tuberculous patients. General advice concerning the value of fresh air, food, rest, and exercise are given. The general sanitary precautions necessary to prevent the spread of the infection are emphasized, and certain general information is given regarding the conduct and daily routine of patients at the Fort Stanton Sanatorium.

BULLETINS OF THE HYGIENIC LABORATORY.

The following bulletins have been published during the fiscal year, and indicate partially the work being carried on at the Hygienic Laboratory:

No. 86. Collected Studies on Typhus. By John F. Anderson and Joseph Goldberger.

There are brought together in this bulletin the series of papers on experimental typhus fever that have appeared in the Public Health Reports, together with one paper published here for the first time. For the sake of completeness, and because they are out of print, it was considered desirable to include the papers that appeared in the winter of 1909–10, which contain the first studies made by the Hygienic Laboratory on typhus.

The subject of typhus fever is one that has become of great public-health interest and importance to the people of the United States, due to the fact that the disease known as "Brill's disease" has been shown by experiments made at the Hygienic Laboratory to be identical with typhus fever. Cases of typhus have been reported from a number of the larger eastern cities, where the conditions for its spread are particularly favorable, and should the disease at any time assume virulence, the health authorities of those cities may be confronted with a serious problem.

No. 87. Digest of Comments on the Pharmacopœia of the United States of America (Eighth Decennial Revision) and on the National Formulary (Third Edition) for the Calendar Year Ending December 31, 1911, by Murray Galt Motter and Martin I. Wilbert.

This bulletin is the seventh of the series, and, like its predecessors, serves to reflect current progress in pharmacology, pharmacy, and related subjects bearing on pharmacopœial revision. The material included in this bulletin is of more than ordinary interest to the makers and users of the pharmacopœia and other books of standards, and illustrates the growing importance of such books of standards from a public-health point of view. The widespread movement to limit official recognition to a more restricted number of drugs and preparations is noted, as is the ever increasing appreciation of the vital importance of international standards for widely used medicaments. The general adherence of the new official European pharmacopœias to the provisions of the international treaty, signed at Brussels November 29, 1906, has resulted in proposals to elaborate the principles involved and to secure international uniformity in methods of testing and in the nomenclature of pharmacopœial articles. The need for some form of restriction of the actively discussed materia medica is demonstrated by the evidence that medicines dispensed on physicians' prescriptions are not always of the quality prescribed by the pharmacopœia, and that the immense number of articles usually carried in stock by the apothecary practically precludes that supervision and care in the testing of medicaments which is inferentially required by the pharmacopœial monographs.

No. 88. Method for determining the toxicity of coal-tar disinfectants, together with a report on the relative toxicity of some commercial disinfectants. By Worth Hale.

This bulletin is a continuation of the work reported by Surg. J. F. Anderson and Passed Asst. Surg. T. B. McClintic in Bulletin No. 82, in which a new method was given for determining the phenol coefficient of disinfectants.

The desirabilty of establishing a toxic coefficient for poisons is pointed out and a method is proposed for determining the relative toxicity of the coal-tar products as they appear in commercial disinfectants. A detailed report is made on the toxicity of 50 different samples of these and a recommendation is made that these products should be labeled poisonous rather than nonpoisonous, as is a common practice.

No. 89. Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. VI. The Missouri River from Sioux City to its mouth. By Allan J. McLaughlin.

The condition of the Missouri River from Sioux City to its mouth is such as to demand attention. The degree of pollution is very much greater than that of the Great Lakes and the dangers in the spread of typhoid fever are pronounced. The effects of pollution have been mitigated in some instances by intelligent purification. The prompt correction of defects and the application of remedies suggested in this bulletin should result in a lowering of the typhoid fever prevalence and considerable saving of life.

LIBRARY.

Forty-two medical and scientific journals were subscribed to during the fiscal year. In addition to these, a large number are received regularly either gratuitously or as exchanges. In most instances these are bound and become a part of the bureau library. Many books, especially ones dealing with sanitation, public health, sewage treatment, and water purification, etc., have been purchased for the library, which now numbers about 7,000 volumes.

There is an urgent need for a librarian, in order that a central library of public health may be organized with the present valuable nucleus of public-health literature in the library. Eighteen hundred dollars per annum should be provided for as a salary for this librarian

NEEDS OF THE SERVICE.

There are many perfectly obvious things to be done for the betterment of urban and rural conditions in the United States. The act approved August 14, 1912, authorized additional Federal activities in the field of scientific research and sanitation, and additional medical officers are required to carry out the intent of the law. This is one of the most urgent needs of the service.

As stated elsewhere in this report, there is need of greater space at the Hygienic Laboratory to provide adequate room for the increased amount of work being done. An additional laboratory building should be provided without delay.

In view of the increasing demands on the part of the public for information regarding sanitary problems and the methods of handling them, larger funds are needed for the printing of publications of the service dealing with these subjects.

The collection of morbidity reports, an important factor in the control and prevention of disease, is at present entirely dependent upon the cooperation of State and local agencies, and no fund is available for measures to insure the receipt of these reports in localities where this cooperation is not given. There is need of an appropriation for this purpose, and an estimate has been submitted for this purpose for the fiscal year 1915.

Respectfully submitted.

Rupert Blue,
Surgeon General.

Hon. W. G. McAdoo,
Secretary of the Treasury.

APPENDIX.

FINANCIAL STATEMENT.

RECEIPTS AND EXPENDITURES, PUBLIC HEALTH SERVICE, FOR THE FISCAL YEAR ENDED JUNE 30, 1913.

Appropriation: Public Health Service, 1913.

Subheads of appropriations.	Appropriations and repayments.	Expenditures.	Balance, June 30,1913.
Pay, etc., commissioned officers and pharmacists	$512,512.50	$492,998.25	$19,514.25
Pay of acting assistant surgeons	200,000.00	189,773.41	10,226.59
Pay of other employees	465,805.00	458,692.51	7,112.49
Freight, transportation, etc	30,000.00	28,596.31	1,403.69
Fuel, light, and water	70,000.00	69,204.09	795.91
Furniture, etc	8,000.00	7,509.43	490.57
Purveying depot supplies (appropriation, $45,000)	50,367.60	50,220.59	147.01
Improving building, etc., purveying depot	2,000.00	[1] 2,000.00	....
Maintenance:			
Hygienic Laboratory	17,000.00	16,970.47	29.53
Marine hospitals (appropriation, $245,000)	252,842.77	252,818.04	24.73
Care of seamen, etc. (appropriation, $126,000)	126,908.40	121,634.68	5,273.72
Books	500.00	493.94	6.06
Disbursements	....	[2] 1,674,004.65	....
Encumbrances	....	16,907.07	....
Total (appropriation, $1,721,817.50)	1,735,936.27	1,690,911.72	45,024.55

[1] Transferred to chief clerk, Treasury Department.

[2] Includes $1,850, transferred to "Contingent expenses, Treasury Department, stationery, 1913."

NOTE.—For expenditures by stations under marine hospitals and relief, see Statistical Table II.

Appropriation: Quarantine Service, 1913.

Amount of appropriations		$169,000.00
Repayments		1,298.44
Total		170,298.44
Expenditures:		
Disbursements	[1] $157,646.51	
Encumbrances	10,616.35	
		168,262.86
Balance June 30, 1913		2,035.58

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[1] Includes $590 transferred to "Contingent expenses, Treasury Department, stationery, 1913."

EXPENDITURES BY STATIONS.

Name of station.	Pay and allowances officers and employees.[1]	Maintenance.	Total maintenance, pay and allowances.
Alexandria	$20.00		$20.00
Beaufort, S. C	1,500.00	$261.54	1,761.54
Biscayne Bay	1,572.00	114.75	1,686.75
Boca Grande	2,040.00	431.13	2,471.13
Brunswick	3,027.50	2,183.23	5,210.73
Cape Charles	8,976.34	9,283.14	18,259.48
Cape Fear	6,113.32	2,230.84	8,344.16
Cedar Keys	300.00		300.00
Charleston	6,714.33	1,662.27	8,376.60
Columbia River	9,831.34	6,302.53	16,133.87
Coos Bay	20.00		20.00
Cumberland Sound	3,180.00	129.59	3,309.59
Delaware Breakwater	3,891.67	3,318.22	7,209.89
Eagle Pass	1,950.00	120.00	2,070.00
Eastport	1,293.34		1,293.34
Eureka	900.00	1,010.88	1,910.88
Fort Bragg	40.00		40.00
Georgetown	240.00	55.00	295.00
Gulf	8,234.67	6,725.74	14,960.41
Hawaii	28,098.23	14,880.69	42,978.92
Key West	4,440.00	1,641.76	6,081.76
Laredo	1,649.34	379.56	2,028.90
Miscellaneous	1,940.00	3,820.04	5,760.04
Mobile	10,722.88	5,135.64	15,858.52
Monterey	20.00		20.00
New Bern	200.00		200.00
New Orleans	24,187.00	12,431.23	36,618.23
Pascagoula	1,695.67	382.80	2,078.47
Pensacola	7,224.17	4,332.18	11,556.35
Perth Amboy	1,503.00	1,476.08	2,979.08
Port Harford	550.00		550.00
Port Inglis	730.00	110.40	840.40
Portland, Me	8,063.32	3,122.92	11,186.24
Porto Rico	23,541.31	8,524.51	32,065.82
Port Royal	1,500.00	271.42	1,771.42
Port Townsend	13,644.16	5,063.45	18,707.61
Providence	2,087.66	137.93	2,225.59
Punta Rassa	325.00	30.36	355.36
Reedy Island	15,023.66	24,390.39	39,414.05
St. Andrews	360.00	206.75	566.75
St. Georges Sound	3,160.00	748.76	3,908.76
St. Johns River	1,980.00	1,002.83	2,982.83
St. Joseph	440.00	201.00	641.00
San Diego	6,244.00	2,788.81	9,032.81
San Francisco	29,140.95	22,430.10	51,571.05
San Pedro	138.30	661.02	799.32
Santa Barbara	55.00		55.00
Savannah	6,899.00	4,134.87	11,033.87
South Atlantic	440.16	118.15	558.31
Tampa Bay	7,137.50	5,273.85	12,411.35
Washington, N. C	604.00		604.00
Leprosy hospital	18,801.17	10,736.50	29,537.67
Total	282,389.99	168,262.86	450,652.85

[1] Paid from pay items appropriation "Public Health Service, 1913."

Appropriation: Preventing the spread of epidemic diseases.

Balance July 1, 1912		$56,694.23
Amount of appropriation		200,000.00
Total		256,694.23
Expenditures:		
Disbursements	[1] $211,574.95	
Encumbrances	6,596.40	

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[1] Includes $260 transferred to "Contingent expenses, Treasury Department: Stationery 1913."

As follows:		
Plague suppressive measures—		
California	$118,004.22	
Porto Rico	59,766.65	
Preventive measures—		
New Orleans	902.50	
Philadelphia and steamer *Bratton*	14,986.40	
Cuba	7,457.14	
China, Italy, Japan	3,724.63	
Mexico	490.00	
Travel, telegraph, vaccine, etc	12,839.81	
		$218,171.35
Balance June 30, 1913		38,522.88

NOTE.—Payments amounting to $93,065.60 were made from pay items, appropriation, "Public Health Service, 1913," account of epidemic duty.

Appropriation: National quarantine and sanitation.

Balance July 1, 1912		$58,803.95
Expenditures	$19,161.86	
Transferred to Supervising Architect	15,372.00	
Encumbrances	1,472.08	
		36,005.94
Balance June 30, 1913		22,798.01

Appropriation: Salaries, office of Surgeon General, Public Health Service, 1913

Amount of appropriations	$41,730.00
Expenditures	40,945.56
Balance June 30, 1913	784.44

Construction appropriations.

HYGIENIC LABORATORY.

Balance June 30, 1913 (act June 25, 1910)	$15,000.00

LEPROSY HOSPITAL, HAWAII.

Balance June 30, 1913 (act Mar. 3, 1905)	16,956.35

MARINE HOSPITALS.

Chicago, Ill.:	
Balance June 30, 1913 (act June 25, 1910)	6,000.00
Cleveland, Ohio:	
Balance June 30, 1913 (act Mar. 4, 1909)	100.00
Balance June 30, 1913 (act Mar. 4, 1907)	374.95
Fort Stanton, N. Mex.:	
Amount appropriated (act Aug. 24, 1912)	4,000.00
Expenditures	3,996.80
Balance June 30, 1913	3.20
New Orleans, La.:	
Amount appropriated (act Aug. 24, 1912)	600.00
Expenditures	600.00

QUARANTINE STATIONS.

Brunswick, Ga.:	
Balance July 1, 1912 (act June 25, 1910)	1,718.82
Expenditures	9.95
Balance June 30, 1913	1,708.87

Charleston, S. C.:		
Balance July 1, 1912 (act Mar. 4, 1909)		$2,308.14
Expenditures	$354.41	
Encumbrances	1,319.27	
		1,673.68
Balance June 30, 1913		634.46
Columbia River:		
Balance June 30, 1913 (act June 25, 1910)		745.47
Delaware Breakwater:		
Balance June 30, 1913 (act Mar. 4, 1907)		857.00
Gulf:		
Balance June 30, 1913 (act Mar. 4, 1907)		353.35
Honolulu:		
Balance June 30, 1913 (act Mar. 4, 1907)		390.52
Amount appropriated (act Aug. 24, 1912)		35,000.00
Pensacola:		
Balance July 1, 1912 (act Mar. 4, 1907)		21.77
Expenditures		3.75
Balance June 30, 1913		18.02
Reedy Island:		
Balance June 30, 1913 (act Mar. 4, 1909)		66.71
San Francisco:		
Balance June 30, 1913 (act June 30, 1906)		3,201.35
Balance June 30, 1913 (act May 27, 1908)		180.75
Savannah:		
Balance June 30, 1913 (act Mar. 4, 1909)		410.85
Portland:		
Amount appropriated (act Aug. 24, 1912)		43,880.00
Transferred to Supervising Architect		43,880.00

STATISTICAL TABLES.

TABLE I.—*Comparative table of number of patients annually treated, 1868 to 1913.*

Fiscal year.	Number of sick and disabled seamen furnished relief.	Fiscal year.	Number of sick and disabled seamen furnished relief.
Prior to organization:		After reorganization—Continued.	
1868	11,535	1891	52,992
1869	11,356	1892	53,610
1870	10,560	1893	53,317
After reorganization:		1894	52,803
1871	14,256	1895	52,643
1872	13,156	1896	53,804
1873	13,529	1897	54,477
1874	14,356	1898	52,709
1875	15,009	1899	55,489
1876	16,808	1900	56,355
1877	15,175	1901	58,381
1878	18,223	1902	56,310
1879	20,922	1903	58,573
1880	24,860	1904	58,556
1881	32,613	1905	57,013
1882	36,184	1906	54,363
1883	40,195	1907	55,129
1884	44,761	1908	54,301
1885	41,714	1909	53,704
1886	43,822	1910	51,443
1887	45,314	1911	52,209
1888	48,203	1912	51,078
1889	49,518	1913	50,604
1890	50,671		

TABLE II.—*Exhibit of the operations of the service during the fiscal year ended June 30, 1913.*

Port.	Total number of seamen treated.	Patients in hospital July 1, 1912.	Admitted during the year.	Total number treated in hospital.	Discharged.	Died.	Remaining in hospital June 30, 1913.	Number of days' relief in hospital.	Number of seamen furnished office relief.	Number of times office relief was furnished.	Number of persons examined physically, including pilots.	Number of foreign seamen treated.	Days hospital relief furnished foreign seamen.	Amount expended.
Grand total	**50.604**	**909**	**13,188**	**14,097**	**12,734**	**435**	**928**	**405,944**	**36,507**	**60,699**	**9,971**	**430**	**5,612**	**$1,315,456.13**
Albany, N. Y	164		19	19	18		1	551	145	176	105			776.65
Ancon, Canal Zone	52	2	50	52	46		6	525						528.60
Apalachicola, Fla	38		10	10	9		1	127	28	35				320.45
Ashland, Wis	103		19	19	19			413	84	94				565.93
Ashtabula, Ohio	31		31	31	28	2	1	360			8			825.49
Astoria, Oreg	149		30	30	30			386	119	182	66			1,111.51
Baltimore, Md	2,112	43	580	623	545	25	53	21,765	1,489	2,185	416			36,039.09
Bangor, Me	47		12	12	12			336	35	44	45			932.31
Barnstable, Mass., and subports														4.00
Bay City, Mich	61		17	17	14	3		219	44	77	11			511.00
Beaufort, N.C	82		6	6	6			58	76	91	38			505.75
Beaufort, S. C	26								26	26				29.00
Bellingham, Wash	34		10	10	10			83	24	53				527.75
Boothbay Harbor, Me	102	1	14	15	15			312	87	207	20			756.60
Boston, Mass	3,012	79	794	873	783	26	63	29,446	2,139	3,751	546	39	531	46,789.52
Bridgeport, Conn	18	1	17	18	16		2	460						334.08
Brunswick, Ga	127	2	28	30	30			269	97	118	10	4	19	815.75
Buffalo, N. Y	2,029	19	451	470	451	8	11	9,992	1,559	2,322	185	1	13	21,780.36
Burlington, Iowa	15	1	14	15	14		1	234						292.50
Cairo, Ill	759	8	182	190	176	5	9	3,517	569	685	20			14,031.26
Cambridge, Md	37		28	28	28			475	9	9				761.76
Castine, Me														7.00
Cedar Keys, Fla	16								16	24				5.35
Charleston, S. C	511		59	59	56	3		614	452	633	55			2,166.43
Chattanooga, Tenn	16		12	12	12			203	4	7				330.50
Chicago, Ill	1,909	47	495	542	471	28	43	17,439	1,367	2,656	218			44,323.92
Cincinnati, Ohio	190	1	15	16	14		2	209	174	335	77			2,227.85
Cleveland, Ohio	1,552	28	395	423	383	14	26	10,540	1,129	2,299	184	4	35	22,600.00
Corpus Christi, Tex	1								1	1				31.00
Crisfield, Md	141		5	5	5			98	136	181	2			400.16
Cristobal, Canal Zone	1		1	1	1			18						18.00
Delaware Breakwater, Del	157		7	7	6		1	57	150	284	46			
Detroit, Mich	1,076	7	281	288	265	7	16	7,717	788	2,467	183			25,586.43
Dubuque, Iowa														50.00
Duluth, Minn	471	1	32	33	29	1	3	605	438	509				1,113.75

TABLE II.—*Exhibit of the operations of the service during the fiscal year ended June 30, 1913*—Continued.

Port.	Total number of seamen treated.	Patients in hospital July 1, 1912.	Admitted during the year.	Total number treated in hospital.	Discharged.	Died.	Remaining in hospital June 30, 1913.	Number of days' relief in hospital.	Number of seamen furnished office relief.	Number of times office relief was furnished.	Number of persons examined physically, including pilots.	Number of foreign seamen treated.	Days hospital relief furnished foreign seamen.	Amount expended.
Eastport, Me.														$3.50
Edenton, N. C.	55								55	85				105.50
Elizabeth City, N. C.	144								144	302	211			351.50
Ellsworth, Me.	7								7	13				13.00
El Paso, Tex.														15.00
Erie, Pa.	124		31	31	29	1	1	449	93	130	42			1,071.50
Escanaba, Mich.	74	1	18	19	18		1	240	55	55	2			543.00
Eureka, Cal.	61		18	18	17		1	235	43	45	14			846.56
Evansville, Ind.	499	6	129	135	125	5	5	3,248	364	495	44			14,178.61
Fernandina, Fla.	93		10	10	10			110	83	129				476.50
Fort Stanton, N. Mex.	314	176	138	314	121	47	146	65,999						117,017.29
Gallipolis, Ohio.	160	4	55	59	59			1,092	101	244	4			1,736.00
Galveston, Tex.	1,503	9	426	435	416	5	14	6,942	1,068	1,459	153			13,338.91
Georgetown, S. C.	224		28	28	26	2		294	196	253	11			1,094.50
Gloucester, Mass.	289		24	24	21	1	2	525	265	363	45			1,333.37
Government Hospital for the Insane.	54	49	5	54	2	4	48	16,975						10,932.51
Grand Haven, Mich.	28		9	9	9			108	19	28	76			460.51
Green Bay, Wis.	57		11	11	11			254	46	51	44			618.20
Hartford, Conn.	15		15	15	13	1	1	304						303.00
Honolulu, Hawaii.	885	13	239	252	223	12	17	6,699	633	1,011	66	12	113	14,238.30
Hoquiam, Wash.	76		38	38	37	1		669	38	38				1,500.35
Hygienic Laboratory.														119,066.25
Immigration Service.														199,634.88
Irvington, Va.	61	1	6	7	7			73	54	85				409.50
Jacksonville, Fla.	406	4	66	70	68	1	1	800	336	424	61			2,545.61
Juneau, Alaska.	101	1	18	19	19			194	82	194	4			1,444.00
Kansas City, Mo.	37		5	5	5			59	32	42	1			356.50
Ketchikan, Alaska.	158	1	27	28	28			470	130	283	4			1,992.10
Key West, Fla.	459	10	124	134	127	4	3	3,096	325	382	27	29	400	9,794.84
La Crosse, Wis.	27		7	7	6		1	85	20	26	12			458.39
Little Rock, Ark.	30		9	9	9			103	21	26	6			339.70
Los Angeles, Cal.	590	5	173	178	163	6	9	3,042	412	717	34			12,657.10
Louisville, Ky.	1,037	13	265	278	257	11	10	6,353	759	1,383	60			16,498.59
Ludington, Mich.	111	1	20	21	19	1	1	351	90	173	63			906.10
Machias, Me.	14	1	5	6	6			81	8	21	63			421.50
Manistee, Mich.	88		8	8	8			135	80	171	40			575.89
Manitowoc, Wis.	122	3	42	45	39	2	4	655	77	105	17			1,055.00
Marquette, Mich.	84	1	16	17	17			381	67	69	27			751.11

Memphis, Tenn	1,225	17	357	374	355	14	5	5,662	851	1,286	134			16,054.58
Menominee, Mich	25		3	3	3			31	22	26				335.35
Milwaukee, Wis	1,173	8	268	276	261	4	11	4,779	897	1,373	195			10,686.03
Miscellaneous														1,657.89
Mobile, Ala	1,191	17	387	404	369	15	20	8,369	687	1,159	139	135	1,704	16,174.39
Morgan City, La														288.50
Nashville, Tenn	72	1	4	5	5			50	67	110	22			396.25
Natchez, Miss	116		5	5	5			39	111	275	9			440.30
New Bedford, Mass	96	1	9	10	9	1		125	86	156				435.40
Newberne, N. C	284		66	66	65		1	363	218	375	28			1,151.23
New Haven, Conn	31		21	21	19	1	1	219	10	11	77			579.90
New London, Conn	66		20	20	17	3		450	46	57	126			1,368.45
New Orleans, La	1,637	30	424	454	408	14	32	14,747	1,183	2,162	292	102	1,483	27,851.80
Newport, Ark	83		1	1	1			4	82	124				399.10
Newport, R. I	58		58	58	57	1		1,000			33			1,877.50
Newport News, Va	58								58	58				344.40
New York, N. Y	3,235	74	954	1,028	913	35	80	25,344	2,207	3,736	1,695	4	92	46,146.10
Nome, Alaska	8		3	3	1	1	1	25	5	14				655.75
Norfolk, Va	2,502	7	597	604	576	12	16	8,525	1,898	2,362	440			15,308.46
North Bend, Oreg	39		15	15	13	1	1	262	24	36	25			782.50
Ogdensburg, N. Y	119	1	17	18	18			384	101	197	30			953.93
Oswego, N. Y	35		10	10	9	1		139	25	41				309.65
Paducah, Ky	80		7	7	7			68	73	168	13			443.63
Pensacola, Fla	230	2	44	46	42	2	2	564	184	590	50			1,401.50
Philadelphia, Pa	1,685	6	454	460	431	14	15	5,528	1,225	1,843	619			16,247.61
Pittsburgh, Pa	614	4	151	155	145	4	6	3,945	459	655	157			14,684.36
Ponce, P. R	48		4	4	4			77	44	75				92.50
Port Arthur, Tex	109		7	7	7			108	102	215	25			396.31
Port Huron, Mich	90		3	3	1		2	24	87	240				536.00
Portland, Me	605	17	223	240	224	3	13	7,003	365	449	132	4	48	23,867.17
Portland, Oreg	746	3	164	167	156	1	10	3,139	579	1,008	132	10	179	9,119.00
Portsmouth, N. H	15		2	2	2			8	13	13	23			23.00
Port Tampa, Fla	171	5	59	64	57	6	1	1,429	107	138	22			2,516.80
Port Townsend, Wash	384	28	252	280	236	4	40	13,674	104	175	5	5	137	15,895.65
Providence, R. I	347	1	178	179	171	3	5	2,030	168	203	107			2,999.96
Provincetown, Mass	48								48	64	55			232.00
Purveying Depot														58,663.91
Railroad transportation, freight charges, etc														23,762.91
Richmond, Va	59		4	4	4			44	55	114				367.40
Rockland, Me	252		2	2	2			31	250	434	51			548.57
Saginaw, Mich	91	1	8	9	7	1	1	171	82	99	5			473.43
Salem, Mass	6								6	6				6.00
San Diego, Cal	96		10	10	10			214	86	143	1			1,038.45
Sandusky, Ohio	77		9	9	7	1	1	145	68	88	26			344.00
San Francisco, Cal	3,421	71	1,186	1,257	1,142	31	84	35,980	2,164	4,484	837	52	538	54,923.12
San Juan, P. R	399	5	115	120	117	1	2	1,918	279	449	83			2,957.65
St. Louis, Mo	817	17	241	258	234	8	16	8,628	559	776	133	1	17	18,828.64
St. Paul, Minn	4		1	1	1			10	3	7				25.25
Sault Ste. Marie, Mich	220	6	100	106	99	1	6	1,143	114	114	66			1,834.50
Savannah, Ga	1,111	24	300	324	287	10	27	9,562	787	1,022	132	4	28	23,999.03
Seattle, Wash	1,562	7	249	256	249	4	3	3,709	1,306	2,589	490	17	192	11,467.65

TABLE II.—*Exhibit of the operations of the service during the fiscal year ended June 30, 1913*—Continued.

Port.	Total number of seamen treated.	Patients in hospital July 1, 1912.	Admitted during the year.	Total number treated in hospital.	Discharged.	Died.	Remaining in hospital June 30, 1913.	Number of days' relief in hospital.	Number of seamen furnished office relief.	Number of times office relief was furnished.	Number of persons examined physically, including pilots.	Number of foreign seamen treated.	Days hospital relief furnished foreign seamen.	Amount expended.
Sheboygan, Wis	16		7	7	7			87	9	10	20			$392.45
Solomons, Md	281		7	7	7			54	274	339	2			568.00
Special duty, etc														26,447.54
Superior, Wis	296	3	63	66	61	1	4	932	230	287				1,628.00
Tacoma, Wash	152		25	25	25			486	127	229	13	5	73	1,552.30
Toledo, Ohio	362	1	148	149	146	2	1	2,087	213	721	48			2,920.20
Valdez, Alaska	122		5	5	5			51	117	196				763.75
Vicksburg, Miss	186	1	77	78	76	1	1	822	108	177				1,814.29
Vineyard Haven, Mass	251	9	103	112	96	5	11	3,571	139	149	12	1	2	11,995.77
Washington, D. C. (bureau)														45,559.76
Do	121	1	32	33	32	1		530	88	138	31			2,547.47
Washington, N. C	134		23	23	23			253	111	158	12			287.50
Wilmington, N. C	417	2	107	109	103	2	4	1,238	308	403	58	1	8	10,901.22

TABLE III.—*Summary of physical examinations made by officers of the United States Public Health Service during the fiscal year ended June 30, 1913, exclusive of immigrants.*

Summary of examinations and rejections.	Total.	Pilots.	Merchant seamen.	Revenue-Cutter Service.	Life-Saving Service.	Coast and Geodetic Survey.	Lighthouse Service.	Foreign seamen.	Immigration Service.	Civil Service Commission.	Isthmian Canal Commission.	Philippine Islands.
Total number examined	9,971	5,904	744	1,286	1,379	102	97	15	245	155	6	38
Number passed	8,590	5,816	724	1,086	1,340	95	93	8	235	150	5	38
Number rejected	381	88	20	200	39	7	4	7	10	5	1	
Causes of rejection, diseases, disability, etc.												
Alcoholism	1			1								
Adenoids	1			1								
Aneurysm of arteries	1				1							
Abscess of neck	1									1		
Albuminuria	1			1								
Blind in one eye	4	2		1	1							
Boil	1								1			
Bursitis, chronic	1		1									
Color blind	83	67	2	10	4							
Cataract, lenticular	1	1										
Conjunctivitis, chronic	1			1								
Corneal opacity	1			1								
Carbuncle	1			1								
Defective vision	77	31		35	10					1		
Defective teeth	6		1	5								
Defective hearing	10			9			1					
Deformity of hand	2			2								
Deformity of foot	2			1	1							
Deflected septum of nose	1			1								
Debility	3		2		1							
Enlarged tonsils	2			2								
Eczema	1						1					
Epithelioma of lip	1				1							
Enlarged lymph glands	2			2								
Fistula in ano	1	1										
Flat foot	5			4	1							
Fracture of ribs	1				1							
Fracture radius	1							1				
Gonorrhea	8			6					1	1		
Goiter	4			2		1			1			
Hernia	15		1	7	2			2	2	1		
Hypertrophy of heart	1			1								
Hematuria	3				3							
Hydrocele tunica vaginalis	1								1			
Hypertrophy tonsils	1			1								
Irregular action of heart—abnormal rapidity	8			6	2							
Inflammation of bladder	1		1									
Insufficient chest expansion	2			2								
Inflammation connective tissue	1								1			
Lacerated wound of wrist	1				1							
Locomotor ataxia	1				1							
Mania, acute	1								1			
New growth, nonmalignant	1			1								
Nephritis, chronic	3		1		2							
Nervous weakness	1				1							
Piles, external	2			1	1							
Poor physique	7			6		1						
Physical weakness	1			1								
Physical disability	2			1		1						
Phthirius inguinalis	1									1		
Rheumatism	4				4							
Renal calculus	1				1							
Rales in apex of lung	1			1								
Scabies	2			2								
Soft chancre	3			1	1				1			
Syphilis, secondary	9			9								
Staphyloma of cornea	1		1									
Stiff finger	1		1									
Trachoma	3			2					1			
Tubercle of lungs	4			1				1	2			
Tubercle of spine	1								1			
Tonsillitis, chronic	1			1								
Undersize	1				1							
Underweight	5			2	3							

TABLE III.—*Summary of physical examinations made by officers of the United States Public Health Service during the fiscal year ended June 30, 1913, etc.*—Continued.

Summary of examinations and rejections.	Total.	Pilots.	Merchant seamen.	Revenue-Cutter Service.	Life-Saving Service.	Coast and Geodetic Survey.	Lighthouse Service.	Foreign seamen.	Immigration service.	Civil Service Commission.	Isthmian Canal Commission.	Philippine Islands.
Causes of rejection, diseases, disability, etc.—Continued.												
Underdevelopment	1			1								
Ulcer of leg	1			1								
Ulcer of tonsils	2			1	1							
Ulcer of penis	2			1						1		
Ulcer of umbilicus	1		1									
Valvular disease of heart—mitral	27			18	7	1	1					
Varix	10			7	1			1	1			
Varicocele	19			19								

TABLE IV.—*Tabular statement of diseases and injuries treated during the year ended June 30, 1913.*

Diseases.	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total.
Total cases	**909**	**13,188**	**7,493**	**4,826**	**470**	**370**	**928**	**36,531**	**50,604**
General diseases	**401**	**5,012**	**2,709**	**1,995**	**174**	**192**	**343**	**13,107**	**18,520**
Smallpox	1	40	24	14		1	2	3	43
Cowpox		3	2	1				2	5
Chickenpox		3	3					3	6
Measles	1	74	75					2	77
Rubella		1	1						1
Scarlet fever		1	1						1
Dengue		9	9					1	10
Influenza	2	231	196	35	1		1	625	858
Whooping cough								3	3
Mumps	2	52	48	4			2	29	83
Diphtheria	2	37	38				1		39
Cerebrospinal fever		3	1			2			3
Simple continued fever	2	10	8	2			2	6	18
Enteric fever	26	339	293	13	1	31	27	27	392
Choleraic diarrhea		5	2	3				2	7
Dysentery	4	47	35	10	3	1	2	178	229
Beriberi		1		1					1
Malarial fever:									
Intermittent	8	582	443	132	8	1	6	1,020	1,610
Remittent	5	112	86	10	18	2	1	44	161
Erysipelas	2	45	39	3	1	1	3	32	79
Pyemia		1		1				1	2
Septicemia	1	6	1	5		1		34	41
Tubercle	215	705	64	486	69	111	190	299	1,219
Leprosy	1	1			1		1		2
Syphilis:									
Primary	1	104	15	87			3	420	525
Secondary	31	773	96	631	29	10	38	3,051	3,855
Tertiary	1	19		15	5			8	28
Gonorrhea	23	603	449	152		8	17	3,585	4,211
Diseases dependent on animal parasites	2	108	64	44			2	583	693
Diseases dependent on vegetable parasites		21	12	9				77	98

Table IV.—*Tabular statement of diseases and injuries treated during the year ended June 30, 1913*—Continued.

Diseases.	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total.
General diseases—Continued.									
Effects of vegetable poisons									
Opium		4		4					4
Morphine	1	7	3	2	2		1	3	11
Cocaine		1		1					1
Effects of inorganic poisons	1	3	2	1		1		9	12
Effects of the presence of foreign bodies		8	3	3			2	35	43
Effects of mechanical injuries	1	3	2	1	1			28	32
Effects of heat		16	15	1				12	28
Effects of chemical agents								11	11
Alcoholism	8	314	236	68	4	7	7	182	504
Rheumatic fever	6	136	93	46			3	17	159
Rheumatism	19	305	226	94			4	2,303	2,627
Gout		2	2					2	4
Osteoarthritis	3	2		3			2	3	8
Cyst:									
Mucous		2	2					3	5
Sebaceous	3	33	21	11	3		1	21	57
Pellagra	3	14	1	10	1	2	3	2	19
New growth, nonmalignant	2	66	49	15	4			167	235
New growth, malignant	6	43	11	17	6	8	7	39	88
Anemia	1	24	10	6		1	8	38	63
Idiopathic anemia	1	4		3	1	1		2	7
Purpura		1	1					4	5
Diabetes mellitus	5	31		24	8	2	2	19	55
Diabetes insipidus		1		1				7	8
Leucocythemia		2	1				1		2
Congenital malformations	1	4	3	1			1	3	8
Hemophilia		2	2						2
Debility	8	47	20	25	7	1	2	143	198
Old age	2				1		1	2	4
Local diseases.									
DISEASES OF THE NERVOUS SYSTEM	140	382	122	223	34	25	118	879	1,401
Of the nerves:									
Inflammation—									
Neuritis	2	52	23	25	2	1	3	75	129
Multiple neuritis		3	1	1			1		3
Of the spinal cord and membranes—Membranes:									
Inflammation of dura mater		2				1	1	1	3
Of the spinal cord and membranes—Cord:									
Inflammation, local		3		2		1			3
Degeneration—									
Of anterior cornua		4	3	1					4
Of lateral columns		1		1					1
Of posterior columns	32	69	20	42	7	7	25	21	139
Of the brain and its membranes—Membranes:									
Inflammation of dura mater	1	2	1	1		1			3
Hemorrhage	3	1		2	1	1			4
Of the brain and its membranes—Brain:									
Abscess		1					1	1	2
Hemorrhage	3	24	7	8		5	7	5	32
Hyperemia								1	1
Functional nervous disorders with other diseases of undetermined nature:									
Apoplexy	1	2		2			1	2	5
Paralysis—									
Paraplegia	6	5	3	1			7		11
Hemiplegia	15	15	2	13	4	3	8	20	50
Monoplegia	2	1			3				3
Local paralysis	6	2		5	3			7	15

TABLE IV.—*Tabular statement of diseases and injuries treated during the year ended June 30, 1913*—Continued.

Diseases.	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total.
Local diseases—Continued.									
DISEASES OF THE NERVOUS SYSTEM—Continued.									
Functional nervous disorders with other diseases of undetermined nature—Continued.									
Incomplete paralysis	3	2		1	1		3	9	14
Chorea								1	1
Spasm	1	4	5					15	20
Torticollis	1		1					7	8
Eclampsia		1		1				2	3
Epilepsy	2	19		19		1	1	21	42
Vertigo		3		2	1			28	31
Headache	3	19	12	10				120	142
Anesthesia		1		1				3	4
Neuralgia	1	66	20	47				287	354
Hysteria		7		6	1			3	10
Nervous weakness		51	20	27	3		1	231	282
Mental diseases:									
Mania	12	3	2				13	1	16
Melancholia	2	7		1	3	1	4	5	14
Dementia	28	7		1	4		30	2	37
Mental stupor	1	3		3		1			4
General paralysis of the insane	9	1				1	9		10
Delusional insanity	4	1			1		4	5	10
DISEASES OF THE EYE	14	103	51	48	12		6	462	579
Conjunctivitis—Catarrhal:									
Acute		27	17	7	1		2	298	325
Chronic		3	2	1				3	6
Granular		2		2				7	9
Ecchymosis of conjunctiva								2	2
Chronic hyperemia of conjunctiva								1	1
Keratitis		5	2	3				6	11
Ulceration of cornea	1	13	7	6			1	5	19
Iritis		29	16	13				24	53
Mydriasis, paralytic		1			1				1
Choroiditis		1		1					1
Glaucoma	1	1	1				1	2	4
Optic neuritis		1	1					3	4
Atrophy and degeneration of optic nerve or papilla	1	1	1	1					2
Retinitis		1		1				1	2
Lenticular cataract	11	5	4	7	4		1	7	23
Hypopyon, staplyoma		2		1	1				2
Detachment of retina		2		1	1			1	3
Panophthalmitis, traumatic		1			1				1
Amblyopia—Temporary blindness		1		1				1	2
Ametropia—									
Myopia		2			2			8	10
Hypermetrophia								2	2
Presbyopia								2	2
Squint		1			1				1
Dacryocystitis, chronic		2		2				1	3
Obstruction of nasal duct		1		1					1
Blepharitis marginalis								11	11
Sty								67	67
Abscess of eyelid		1					1	5	6
DISEASES OF THE EAR	3	49	26	20	3		3	393	445
Inflammation of the external meatus:									
Acute		2	1	1				17	19
Chronic		4	2	2					4
Abscess		1	1					13	14
Hematoma of the auricle		1	1						1
Accumulation in external meatus of wax or epidermis		4	3		1			153	157

TABLE IV.—*Tabular statement of diseases and injuries treated during the year ended June 30, 1913*—Continued.

Diseases.	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total.
Local diseases—Continued.									
DISEASES OF THE EAR—Continued.									
Inflammation of the middle ear:									
Nonsuppurative	2	22	13	9			2	146	170
Suppurative	1	15	5	8	2		1	37	53
Perforation of membrana tympani								4	4
Anchylosis of ossicles								2	2
Obstruction of Eustachian tube								3	3
Tinnitus								5	5
Deafness								13	13
DISEASES OF THE NOSE		63	38	22	1	1	1	469	532
Inflammation of soft parts		49	30	17	1		1	405	554
Inflammation of framework—									
Necrosis		1		1				2	3
Diseases of septum—									
Abscess		1	1						1
Deviations								9	9
Epistaxis		3	3					6	9
Inflammation of the accessory sinuses		7	3	4				13	21
Inflammation of the nasopharynx		2	1			1		34	36
DISEASES OF THE CIRCULATORY SYSTEM	46	369	71	203	70	40	34	597	1,012
Pericarditis		3		1		1	1	7	10
Endocarditis	2	7		6	1	2		3	12
Valvular disease—									
Aortic	10	23	5	16	4	6	2	53	86
Mitral	13	67		56	4	7	13	171	251
Aortic and mitral	10	43		27	8	13	5	10	63
Myocarditis	5	48	4	11	35	2	1	23	76
Degeneration of heart, fatty		6		1	4		1	3	9
Adhesion pericardium								1	1
Hydropericardium								3	3
Hypertrophy of heart		3		3				1	4
Dilatation of heart		8	2	4	1		1	17	25
Angina pectoris		3		3				3	6
Disordered action of the heart—									
Abnormal slowness		16	1	10	5				16
Abnormal rapidity		1					1	12	13
Irregularity		2		2					2
Arteritis		7	1	5			1	26	33
Degeneration of arteries—Arterio-capillary fibrosis	2	32	1	24	1	5	3	19	53
Aneurysm of arteries	5	10		6	1	4	4		15
Obstruction of arteries—									
Thrombosis		1		1				1	2
Embolism								1	1
Phlebitis		5	3	2				12	17
Varix		84	49	30	4		1	227	311
DISEASES OF THE RESPIRATORY SYSTEM	36	612	347	225	19	38	19	2,885	3,533
Hay fever								10	10
Alphonia								2	2
Inflammation of mucous membrane of larynx—									
Catarrhal, acute	1	32	20	12			1	83	126
Tracheitis, catarrhal								13	13
Bronchitis—									
Catarrhal, acute	15	167	119	58	2	2	1	2,198	2,380
Catarrhal, chronic	7	76	26	43	8	3	3	283	366
Membranous		7	4	3					7
Spasmodic asthma	2	58	17	34	1	4	4	79	139
Congestion of lung		5	2			2	1	1	6
Hemorrhage of lung—Hemoptysis								2	2
Pneumonia	7	132	94	14	7	20	4	9	148
Broncho-pneumonia		16	9	7				1	17
Abscess of lung	1	2	1	1		1			

TABLE IV.—*Tabular statement of diseases and injuries treated during the year ended June 30, 1913*—Continued.

Diseases.	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total.
Local diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Chronic interstitial inflammation		3		2		1		1	4
Phthisis—									
Acute		2		1			1		2
Chronic								2	2
Emphysema, vesicular		2	1	1				2	4
Pleurisy—									
Acute	1	75	50	22	1	2	1	189	265
Chronic	1	6	3	3			1	10	17
Empyema	1	5	1	2		1	2		8
Gangrene of lung		2				2			2
Adhesions of pleura		1		1					1
DISEASES OF THE DIGESTIVE SYSTEM	39	1,531	1,096	375	24	19	56	5,426	6,996
Inflammation of the lips								8	8
Ulceration of the lips								8	8
Fissure of the lips								1	1
Inflammation of the mouth		3	2	1				36	39
Ulceration of the mouth		4	4					13	17
Inflammation of the dental pulp								5	5
Suppuration of the dental pulp								1	1
Caries of dentine and cementum		2	2					81	83
Necrosis of cementum		3	1	2				2	5
Inflammation of dental periosteum		3	2	1				2	5
Abscess of dental periosteum		4	4					19	23
Inflammation of gums and alveoli		1		1				19	20
Suppuration of alveoli		4	3	1				6	10
Ulceration of gums and alveoli		8	2	4	1		1	2	10
Caries of the alveoli								3	3
Toothache								68	68
Ulceration of tonsils		1		1				4	5
Inflammation of the tongue		1		1				6	7
Ulceration of the tongue								3	3
Sore throat		10	9	1				434	444
Inflammation of tonsils—									
Follicular		77	67	10				313	390
Suppuration		13	12	1				135	148
Hypertrophy of tonsils		10	7	2	1			8	18
Elongated uvula								4	4
Inflammation of salivary glands								10	10
Salivation	1	1	2						2
Inflammation of the pharynx—									
Catarrhal		12	6	5			1	269	281
Granular		2	2					5	7
Follicular								19	19
Salivary calculus		2	2					1	3
Ulceration of pharynx		1		1				3	4
Inflammation of the stomach—									
Catarrhal	4	166	91	71	1	2	5	330	500
Ulceration of the stomach—Superficial		22	15	3		1	1	15	37
Hemorrhage of the stomach		3	3					3	6
Dilatation of the stomach	2	5	1	4	2			2	9
Indigestion	3	90	68	21	1	1	2	1,315	1,408
Pyrosis								3	3
Nausea								1	1
Vomiting		1	1					6	7
Gastralgia		7	5	2				5	12
Heartburn								3	3
Perversion of appetite		1	1					1	2
Loss of appetite								21	21
Inflammation of the intestines—									
Enteritis		87	68	16		2	1	52	139
Typhlitis	3	121	92	21		5	6	26	150
Colitis		29	21	8				8	37
Catarrhal		10	5	4		1		24	34

TABLE IV.—*Tabular statement of diseases and injuries treated during the year ended June 30, 1913*—Continued.

Diseases.	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total.
Local diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Ulceration of the intestines		3	1	1		1		1	4
Tympanitis								1	1
Fecal accumulation		11	8	2			1	2	13
Hernia	11	307	242	37	13		26	375	693
Obstruction of the intestines		9	7			2		3	12
Intestinal dyspepsia		8	7				1	4	12
Constipation	2	53	35	19	1			862	917
Colic		27	26				1	35	62
Diarrhea	2	179	122	63			1	400	576
Enteralgia	1	5	6					7	13
Ulceration of the rectum		11	10	1				9	20
Periproctitis								16	16
Abscess		25	17	8					25
Fissure of the anus		4	3	1				6	10
Fistula in ano	1	28	17	10	1	1		21	50
Prolapse of the rectum	1	2	3						3
Prolapse of the anus		1	1						1
Volvulus	2	27	9	16			4	2	31
Piles—									
Internal								21	21
External	2	44	36	9	1			96	142
Mixed		2	1				1	24	26
Pruritus ani		1	1					17	18
Inflammation of the liver—									
Acute	1	7	3	4			1	26	34
Chronic		20	12	6	2		1	11	31
Hyperemia of the liver		3	3					98	101
Degeneration of the liver		1		1					1
Fatty								4	4
Hypertrophy of the liver								2	2
Jaundice	1	21	12	5				29	51
Inflammation of hepatic ducts and gall bladder	1	16	10	6		1		23	40
Calculi		7	3	3			1	9	16
Biliary colic		1	1					18	19
Inflammation of the peritoneum		3	1			2			3
Dropsy	1	2	1	1			1	1	4
DISEASES OF THE LYMPHATIC SYSTEM	27	317	167	153	8		16	422	766
Congestion of spleen		1		1					1
Hypertrophy of spleen		1		1					1
Adhesion of peritoneum	1	1		2					2
Inflammation of lymph glands—Suppuration	16	306	157	144	7		14	404	726
Hypertrophy of lymph glands		3			1		2	1	4
Inflammation of lymphatics—Suppuration	10	4	10	4				17	31
Elephantiasis		1		1					1
DISEASES OF THE THYROID BODY	1	2	1	1	1			5	8
Goiter	1	2	1	1	1			3	6
Hypertrophy of thyroid body								2	2
DISEASES OF THE URINARY SYSTEM	15	176	49	92	12	20	18	349	540
Acute nephritis	4	36	17	15	1	6	1	17	57
Bright's disease—									
Chronic nephritis	8	71	3	44	10	12	10	89	168
Granular kidney	2	8	2	7			1	3	13
Nephralgic kidney								4	4
Hydronephrosis kidney		1					1		1
Abscess—Perinephritic		4	3	1				1	5
Congestion of kidney								1	1
Movable kidney		1		1				4	5
Calculus in kidney		3		3				3	6
Calculus in ureter		1			1			2	3
Suppression of urine		1	1					3	4
Hematuria		6	3	2			1	9	15
Albuminuria								2	2
Lithuria								1	1
Pyelitis		4	1	2		1			4

TABLE IV.—*Tabular statement of diseases and injuries treated during the year ended June 30, 1913*—Continued.

Diseases.	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total.
Local diseases—Continued.									
DISEASES OF THE URINARY SYSTEM—Continued.									
Inflammation of bladder—									
Acute	1	30	16	12			3	78	109
Subacute		2	1			1		37	39
Chronic								29	29
Calculus of bladder		4		4					4
Irritability of bladder		1	1					42	43
Retention of urine		2	1				1	14	16
Incontinence of urine		1		1				10	11
DISEASES OF THE GENERATIVE SYSTEM	36	876	537	319	27	2	27	1,817	2,729
Urethritis		8	3	2				101	109
Gleet		2	2					14	16
Abscess of the urethra		1		1				3	4
Hemorrhage of the urethra		2	1	1				1	3
Stricture of urethra—									
Organic		112	42	53	12	2	3	184	296
Traumatic								3	3
Urethral fistula	1	5	3	1	1		1	13	19
Inflammation of the prostate—									
Acute		1	1					9	10
Chronic		2	1	1				7	9
Abscess of prostate		1	1						1
Hypertrophy of the prostate	3	8	3	5			3	41	52
Posthitis								10	10
Phimosis	3	63	53	12			1	31	97
Paraphimosis		22	17	2			3	5	27
Imflammation of the penis—of the glands	2	12	11	3				32	46
Abscess of penis		2	2					5	7
Ulcer of penis	4	114	56	55	3		4	212	330
Soft chancre	13	248	131	120	4		6	846	1,107
Priapism								1	1
Inflammation of the scrotum		2	1	1				1	3
Abscess of the scrotum	1	3	3	1					4
Pruritus of the scrotum	1	13	10	3	1				14
Imflammation of the spermatic cord		2		2				6	8
Hydrocele of the spermatic cord		9	7	3				16	25
Varicocele	1	41	35	5	1		1	93	135
Hydrocele of tunica vaginalis	4	39	32	9	1		1	34	77
Inflammation of the testicle:									
Acute orchitis	1	103	74	27			3	72	176
Chronic orchitis		1	1						1
Epididymitis	2	44	39	7				31	77
Spermatorrhea		7	1	5	1			23	30
Impotence								15	15
Inflammation of the ovary		4	2	2				2	6
Inflammation of the fallopian tube								1	1
Inflammation of tho uterus		1			1				1
Amenorrhea		1					1	1	2
Dysmenorrhea								2	2
Menorrhagia								1	1
Leucorrhea		1	1					1	2
Abortion		1	1						1
Ectopic gestation		1	1						1
DISEASES OF THE ORGANS OF LOCOMOTION	20	319	189	113	18	1	18	1,264	1,603
Inflammation of the bones—									
Osteitis	2	4	1	3	1		1	9	15
Periostitis	1	7	3	3	2			7	15
Caries	1	4	1	2		1	1	1	6
Necrosis	2	25	11	11	1		4	20	47
Ununited fracture or false joint		1		1					1
Inflammation of joints—									
Acute synovitis	3	64	30	30	4		3	36	103
Chronic synovitis		2	1	1				4	6
Ankylosis	1	1			1		1	6	8
Dislocation of articular cartilage		1		1				1	2

TABLE IV.—*Tabular statement of diseases and injuries treated during the year ended June 30, 1913*—Continued.

Diseases.	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total.
Local diseases—Continued.									
DISEASES OF THE ORGANS OF LOCOMOTION—Continued.									
Loose body in joint		1	1						1
Relaxation of ligament		3	2	1				2	5
Dislocation, shoulder joint		3	3						3
Caries of the spine	1						1	1	2
Posterior curvature of spine	1	1			2				2
Lateral curvature of spine								3	3
Inflammation of muscles		2	2					7	9
Suppuration of muscles		6	4	2				10	16
Myalgia—									
Lumbago	5	156	107	46	5		3	1,068	1,229
Stiff neck								6	6
Contracture of fasciæ		1		1					1
Inflammation of tendons		2	2					2	4
Contraction of tendons		3	1	2				1	4
Inflammation of sheaths of tendons		8	3	3	1		1	17	25
Thecal abscess		7	7					1	8
Ganglion								1	1
Inflammation of bursæ—									
Acute		7	3	1	1		2	15	22
Chronic								4	4
Abscess of bursæ								4	4
Bunion	2	1	2				1	7	10
Bursal cyst		2	2					5	7
Bursal tumor	1	2	2	1					3
Clubfoot		1	1						1
Flat foot		3		3				25	28
Hammer toe		1		1				1	2
DISEASES OF THE CONNECTIVE TISSUE	18	382	248	134	8	2	8	869	1,269
Inflammation	7	122	72	49	2	1	5	423	552
Abscess	11	251	172	82	6	1	1	428	690
Gangrene		4	1	1			2	2	6
Edema		5	3	2				16	21
DISEASES OF THE SKIN	12	453	245	167	12		32	2,504	2,969
Erythema		3	3					22	25
Roseola								1	1
Pityriasis rosea								3	3
Urticaria		4	4					56	60
Prickly heat								33	33
Eczema	1	46	27	18	1		1	493	540
Impetigo		3	1	1	1			15	18
Pityriasis rubra		2	1	1	1			7	9
Prurigro								3	3
Lichen								6	6
Psoriasis		5	1	1	1		2	135	140
Herpes		2		1			1	93	95
Zona		7	3	2			2	28	35
Pemphigus								4	4
Dermatitis herpetiformis		6	4	2				27	33
Acne		2		1	1			109	111
Sycosis		5	3		2			13	18
Seborrhea		1	1					2	3
Ichthyosis								1	1
Chloasma		1			1			1	2
Leucodermia								1	1
Alopecia								1	1
Chilblain								1	1
Ulcer	9	221	110	87	5		19	648	878
Boil	1	56	31	22			4	524	581
Carbuncle	1	44	32	10			3	93	138
Whitlow		7	5	2				68	75
Onychia		35	17	18				41	76
Corn								32	32
Wen		2	2					18	20
Hyperidrosis								7	7
Pruritus								14	14
Lupus								1	1
Rhinoscleroma		1		1				2	3

TABLE IV.—*Tabular statement of diseases and injuries treated during the year ended June 30, 1913*—Continued.

Diseases.	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total.
Injuries.									
General injuries	2	148	103	42		2	3	243	393
Effects of heat:									
Burns and scalds	2	112	77	37				173	287
Heat stroke		18	14	1			3	29	47
Effects of cold								1	1
Effects of chemical irritants and corrosives		1		1				5	6
Multiple injury		5	2	1		2		16	21
Suffocation		3	2	1				1	4
Exhaustion		9	8	1				18	27
Local injuries	82	2,273	1,494	704	49	28	80	4,837	7,192
Contusion of nerves		2	1				1	2	4
Contusion of muscles		1	1					8	9
Strain of muscles		9	5	4				142	151
Rupture of muscles		3	2		1				3
Strain of tendons		2	1	1					2
Rupture of tendons		1					1		1
Wound of tendons		1			1			2	3
Contusion of skin		5	3	2				19	24
Abrasion of skin		1		1				77	78
Wound of skin		8	5	2	1			48	56
Burn or scald of skin	9	101	67	36	2	4	5	246	356
Frostbite	1	10	7	4				3	14
Effects on the skin of irritants or corrosives								4	4
Contusion of mucous membrane								1	1
Abrasion of mucous membrane								6	6
Wound of mucous membrane								3	3
Burn or scald of mucous membrane								2	2
Effects on the mucous membrane of irritants or corrosives		1	1						1
Contusion of scalp		16	12	4				29	45
Wound of scalp	3	101	86	18				226	330
Contusion of skull		7	4		2	1		3	10
Fracture of the vault of skull	3	8	5	4	1	1		1	12
Fracture of the base of skull	1	6	1	1		5		6	13
Concussion of brain		12	8	3			1		12
Contusion of face	1	10	5	5	1			163	174
Wound of face and mouth		61	41	20				142	203
Fracture of facial bones	2	33	19	13	1		2	14	49
Dislocation of nasal cartilages								1	1
Dislocation of lower jaw		1	1					2	3
Contusion of eyelid		7	6	1				6	13
Wound of eyelid		2	2					10	12
Wound of conjunctiva		1		1				4	5
Contusion of eyeball		2		2				6	8
Foreign bodies in the conjunctiva or cornea		5	4	1				132	137
Wound of eyeball		8	4	3			1	16	24
Contusion of pinna		3	1	2				2	5
Wound of pinna								6	6
Foreign body in external meatus								4	4
Contusion of neck		3	2	1				4	7
Wound of neck								12	12
Foreign body in the air passages								1	1
Wound of tongue		6	4	2					6
Contusion of chest		54	40	14				158	212
Dislocation of costal cartillages								1	1
Fracture of ribs		82	66	14	1		1	71	153
Fracture of sternum		1	1					1	2
Wound of parietes of chest		2	1				1	2	4
Penetrating wound of pleura or lung		1	1					1	2
Contusion of back		82	65	16	1		1	150	232
Sprain of back		28	19	8			1	101	129
Wound of back		6	5	1				26	32
Fracture of spine								2	2

TABLE IV.—*Tabular statement of diseases and injuries treated during the year ended June 30, 1913*—Continued.

Diseases.	Remaining in hospital from previous year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hospital at close of year.	Treated at dispensary.	Total.
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Concussion of cord		2		2					2
Contusion of abdomen	1	17	9	6	1	1	1	11	29
Wound of parietes of abdomen		6	6					15	21
Contusion of the pelvis		1	1					3	4
Contusion of the perineum, scrotum, or penis		2		2				2	4
Wound of the male urethra, perineum, scrotum, testis, or penis		9	5	4				13	22
Wound of rectum		1		1					1
Rupture of urethra		2	1				1		2
Fracture or dislocation of pelvic bones		1	1						1
Gunshot wound		9	7	2				5	14
Contusion of testicle		3	2	1				6	9
Contusion of upper extremities		147	85	45	6		1	500	647
Sprain of shoulder		10	7	3				20	30
Sprain of elbow		4	2	2				14	18
Sprain of wrist		16	12	4				78	94
Sprain of hand		2	2					12	14
Wound of upper extermities	13	299	186	113	2		11	934	1,246
Wound of joint, upper extremities								8	8
Fracture of clavicle	3	26	22	7					29
Fracture of scapula		5	4	1					5
Fracture of humerus		15	5	5			5	2	17
Fracture of bones of forearm:									
Radius	1	34		34			1	27	62
Ulna	1	4	4	1				3	8
Both bones								4	4
Fracture of carpus, metacarpus, or phalanges	1	26	13	11	2	1		66	93
Dislocation of clavicle		1	1					29	30
Dislocation of scapula								1	1
Dislocation of humerus		35	28	2	2		3	1	36
Dislocation of phalanges of thumb	1	1		2				2	4
Dislocation of phalanges of fingers								13	13
Contusion of lower extremities	8	220	137	79	3		9	586	814
Sprain of hip		4	2	2				3	7
Sprain of knee	1	36	23	13			1	37	74
Sprain of ankle	3	71	39	31	1		3	91	165
Sprain of foot								20	20
Wound of lower extremities	10	182	122	59		1	12	415	607
Wound of joint, lower extremities		6		5		1		2	8
Fracture of femur	7	225	150	43	18	12	9	1	233
Fracture of patella		7	5	2				1	8
Fracture of tibia	2	54	51				5	5	61
Fracture of fibula	2	15	9	7			1	1	18
Fracture of tibia and fibula	7	49	35	19		1	1	14	70
Fracture of bones of foot:									
Of the metatarsus		12	4	7	1			16	28
Of the phalanges of the toes		10	7	2			1	4	14
Dislocation of femur		3	2	1				3	6
Dislocation of patella		2	2						2
Dislocation of tibia		2	2						2
Dislocation of fibula	1		1						1
Dislocation of foot		1	1					2	3
Dislocation of metatarsus and phalanges		1	1					1	2
Dislocation of astragalus		3	2	1					3
Dislocation of calcis		1			1				1

TABLE V.—*Comparative exhibit—Ratio of deaths from specific causes, 1904–1913.*

Deaths from—	General average.	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
General diseases	49.52	49.49	53.46	51.52	52.17	44.92	50.00	49.03	41.90	50.80	51.89
Diseases of the—											
Nervous system	5.89	5.30	6.32	4.87	6.72	5.06	6.51	3.67	5.18	8.50	6.75
Circulatory system	11.34	8.76	11.88	11.16	10.47	12.06	8.74	13.39	15.12	11.04	10.81
Respiratory system	11.61	14.66	8.81	9.13	11.06	13.42	9.87	13.60	14.90	10.35	10.27
Digestive system	6.26	7.33	4.79	5.88	5.34	4.67	10.08	7.13	5.83	6.44	5.13
Genito-urinary system	6.94	6.72	5.74	6.09	5.54	10.13	7.85	4.97	8.86	7.59	5.94
Injuries	6.72	5.09	7.09	9.13	7.12	7.20	5.61	7.34	6.26	4.37	8.01
From all other causes	1.72	2.65	1.91	2.22	1.58	2.54	1.34	.87	1.95	.91	1.20

TABLE VI.—*Nativity of patients treated in hospitals during the fiscal year ended June 30, 1913.*

Countries.	Number.	Countries.	Number.
Aden	1	Isle of Jersey	1
Africa	17	Jamaica	44
Alaska	3	Japan	43
Arabia	1	Korea	3
Argentine Republic	5	Mauritius	2
Armenia	1	Martinique	1
Australia	34	Malta Island	1
Austria-Hungary	188	Malay Peninsula	1
Barbados	6	Mesopotamia	1
Bermuda Islands	2	Mexico	24
Belgium	34	Montenegro	2
Bohemia	22	New Brunswick	28
British Guiana	7	Newfoundland	76
British Honduras	4	New Zealand	7
British West Indies	31	Norway	1,112
Brazil	4	Nova Scotia	133
Bulgaria	2	Panama	8
Canada	202	Peru	11
Canary Islands	2	Persia	1
Cape Breton	8	Philippine Islands	19
Cape Verde Island	84	Poland	40
Chile	12	Portugal	109
China	20	Porto Rico	33
Colombia	4	Prince Edward Island	21
Costa Rica	1	Roumania	1
Cuba	7	Russia	204
Curaçao	11	St. Thomas	3
Denmark	233	St. Helena	3
Dutch Guiana	1	Saba Island	1
Dutch West Indies	15	Santa Lucia	1
East Indies	1	Santo Domingo	3
Equador	2	Salvador	1
Egypt	1	Scotland	197
England	447	Servia	2
Finland	321	Spain	220
France	71	Sweden	700
Germany	731	Switzerland	36
Grand Cayman	11	Tasmania	1
Greece	96	Turkey	16
Guatemala	1	United States	7,431
Hawaiian Islands	34	Uruguay	1
Haiti	3	Venezuela	4
Holland	64	Wales	14
Iceland	3	West Indies	70
India	9		
Ireland	609	Total	14,097
Italy	101		

Surgical operations, fiscal year 1913.

Operations.	Number of cases.
Total number of operations	1,941
Postoperative mortality	31
Tumors: Excision of	57
Adenoma	1
Angioma	1
Carcinoma	8
Endothelioma	7
Fibroma	11
Keliod	1
Lipoma	7
Neuroma	1
Osteoma	1
Ostis-sarcoma	1
Papilloma	6
Sarcoma	4
Unqualified	8
Cysts: Excision of	17
Cyst of buttock	1
Cyst of neck	1
Sebaceous cyst	11
Unqualified	4
Foreign bodies: Removal of	8
From—	
Lower extremity	5
Nose	1
Upper extremity	2
Abscesses: Incision and drainage	114
Connective tissue of—	
Alveola	1
Axilla	4
Brain	1
Buttock	2
Ear	1
Face	4
Gluteal	1
Ischeo-rectal fossa	11
Lumbar region	4
Lower extremity	19
Neck	10
Parasternal region	1
Periosteal	2
Perineum	10
Perinephritic	2
Perirectal region	4
Prostage	1
Scrotum	2
Upper extremity	27
Unclassified	7
Blood vessels	349
Arteries—Ligation to control hemorrhage	4
Veins—	
For varix—	
Ligation	3
Phlebectomy (unqualified)	22
Mayo operation	3
Schede operation	12
Aneurism—Matas operation	1
Intravenous injection of—	
Salvarsan—	
For syphilis	189
For hemiplegia	1
Neosalvarsan—	
For syphilis	108
For gonorrheal arthritis	6
Nerves	3
Stretching	3
Lymphatic glands	221
Incision and drainage for suppuration—	
Cervical	1
Femoral	11
Inguinal (bubo)	69
Enucleation—	
Axillary	2
Cervical	10
Inguinal (bubo)	128
Skin and subcutaneous tissue	86
Incision and drainage for—	
Inflammation	7
Cellulitis	1
Wound, infected	16
Wound, lacerated	3
Curettage for ulcer	5
Excision of condyloma	5
Operation for onychia	8
Skin grafting for—	
Chronic ulcer	4
Wound	5
Suture and dressing, for wound of—	
Back	1
Face	2
Lower extremity	5
Scalp	15
Upper extremity	9
Bones	114
Simple fracture—	
Reduction, splints, or extensions—	
Clavical	2
Colles	1
Femur	5
Nasal	2
Oscalcis	1
Phalanges	2
Radius	6
Radius and ulna	4
Rib	7
Tibia	4
Tibia and fibula	3
Fibula	3
Ulna	1
Metacarpus	1
Bone exposed and wired—	
Maxilla, inferior	1
Patella	6
Radius	1
Ulna	1
Bone exposed, loose fragments removed — internal condyle of femur—	
Skull	1
Tibia and fibula	1
Bone exposed, Lane's bone plates applied—	
Femur	2
Humerus	4
Tibia	1
Tibia and fibula	5
Ulna and radius	1
Bone graft	1
Compound fracture—	
Reduction, wiring, or splints—	
Femur	3
Fibula	1
Humerus	1
Maxilla, inferior	1
Tibia	2
Tibia and fibula	4
Unclassified	1
Fracture dislocation—	
Reset, splints—Pelvis bones	1

Surgical operations, fiscal year 1913—Continued.

Operations.	Number of cases.
BONES—Continued.	
Resection or curettage of portion of bone for injury, disease of necrosis—	
Clavical	1
Coccyx	1
Femur	4
Humerus	1
Maxilla, inferior	7
Maxilla, superior	2
Malar	1
Metatarsal bone	1
Os Innominatum	2
Radius	1
Tarsus	1
Tibia	3
Unqualified	8
JOINTS	31
Reduction of dislocation of—	
Clavical	1
Hip	2
Jaw	1
Maxillary, inferior	1
Radius	2
Shoulder	4
Tarso-metatarsal joint	1
Ulna	1
Patella	1
Arthrotomy and drainage—	
Elbow	1
Knee	6
Unclassified	2
Arthrotomy—	
Removal of loose cartilage	1
Exploratory, knee	4
Tubercle, ankle	1
Irrigation and injection of tubercle, knee joint	2
MUSCLES, TENDONS, AND FISCIA	1
Incision and drainage for tenorrhaphy	1
BURSEA	7
Incision and drainage, for—	
Inflammation	4
Excision	3
AMPUTATIONS	61
For disease or injury of—	
Arm	2
Fingers	34
Foot	2
Hip	1
Leg	4
Thigh	4
Toes	14
SKULL	8
Trephining, for—	
Fracture	3
Mastoiditis	5
FACE, NASAL CAVITIES, AND MOUTH	38
Excision of—	
Adenoids	1
Nasal septum	4
Nasal polypus	2
Turbinates	4
Incision and drainage for—	
Suppurative alveoli	1
Suppurative tonsillitis	7
Tosillectomy	18
Tosillotomy	1
EYE	9
Discission of capsule, for soft cataract	1
Enucleation of eyeball, for injury	2
Excision of pterygium	1
Extraction of lens, for cataract	1
Foreign body	2
Incision for chalazion	1
Probing and slitting, for stricture of puncta	1
EAR	3
Meatotomy	2
Perforation of membrana tympani, for suppurative otitis media	1
THORAX	10
Thoracentesis, for—	
Empyema	3
Pleurisy, chronic	1
Resection of rib, for—	
Abscess of liver	1
Abscess of diaphragm	1
Drainage of pulmonary cavity	1
Empyema	3
ABDOMEN	378
Abdominal section, for—	
Appendectomy, closure	84
Appendectomy, drainage	31
Cholecystectomy	1
Cholecystotomy, drainage	9
Colostomy	1
Drainage, abscess of liver	2
Ectopic gestation	1
Enterorrhaphy, for typhoid perforation	3
Exploration, for—	
Gastrectomy	1
Ulcer of stomach	1
Gastroenterostomy, for—	
Carcinoma of stomach	1
Gastrojejunostomy	1
Pyloricstenosis	1
Ulceration of stomach	1
Gastrorrhaphy, for perforating gastric ulcer	2
Obstruction of bowels	1
Omental adhesions	1
Hernioplasty, for—	
Femoral hernia	1
Inguinal hernia—	
Bassini operation	176
Ferguson	21
Halsted operation	1
Modified Bassini	11
Unclassified	3
Strangulated inguinal hernia	3
Umbilical hernia (Mayo)	2
Ventral hernia (Mayo)	3
Exploratory	9
Paracentesis	5
Nephrectomy	1
RECTUM AND ANUS	84
Excision of—	
Polypus	1
Condylomata	1
Stricture, incision and dilatation	1
Fistula in ano—	
Incision	20
Excision	9
Division of sphincter	2
Unqualified	1

Surgical operations, fiscal year 1913—Continued.

Operations.	Number of cases.
RECTUM AND ANUS—Continued.	
Hemorrhoids—	
External—	
Clamp and cautery	6
Excision	4
Ligation	4
Internal—	
Clamp and cautery	3
Excision	2
Mixed—	
Clamp and cautery	10
Excision	11
Ligation	6
Whitehead operation	3
URINARY BLADDER	4
Suprapubic cystotomy, for—	
Calculus	1
Cystitis, gonorrheal	1
Perineal fistula and urethral stricture	1
Endoscopic examination—Inflammation of bladder	1
URETHRA	39
Organic structure—	
Gradual dilatation	19
Perineal section	2
Rapid dilatation	3
Urethrotomy, external	7
Urethrotomy, internal	5
Urethrotomy, external and internal	2
Fistula—Dissection	1
MALE ORGANS OF GENERATION	279
Penis—	
Amputation, for epithelioma	2
Circumcision, for—	
Chancroid	4
Paraphimosis	12
Phimosis	182
Redundant prepuce	3
New growth, nonmalignant	1
Dorsal incision, for—	
Chancroid	1
Phimosis	1
Stricture for fistula	1
Incision and drainage, for cellulitis	1
MALE ORGANS OF GENERATION—Contd.	
Operations for hydrocele—	
Bottle operation	13
Excision of sac	10
Incision	2
Tapping	4
Volkmann operation	1
Unclassified	5
Operations for varicocele—	
Ligation and cutting veins	15
Phlebectomy	19
Unqualified	2
Prostate—	
Incision and drainage, for abscess	2
Prostatectomy, for—	
Hypertrophy	3
Carcinoma	1
Testicle—	
Castration for—	
Hydrocele	1
New growth, nonmalignant	2
Orchitis, chronic	2
Tubercle	3
New growth, malignant	1
Undescended testicle	2
Incision and drainage, for abscess	1
Vas deferens—Vasectomy, for tubercle	2
FEMALE ORGANS OF GENERATION	3
Curettage	1
Perineorrhaphy, for laceration of perineum	1
Trachelorrhaphy	1
CARBUNCLE	11
Excision	1
Incision and drainage	10
GUNSHOT WOUNDS: Leg	1
GANGRENE	4
Amputation of—	
Foot	1
Leg	1
Thigh	1
Toes	1

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